The Passaic River Study Area

United States Environmental Protection Agency, Region II

Status of PRP Search and Issuance of Notice Letters

Prepared by:Andrews & Kurth L.L.P.
1717 Main Street, Suite 3700
Dallas, Texas 75201

Contact:Paul W. Herring
214-659-4504 (Office telephone)
214-659-4837 (Office fax)

For Chemical Land Holdings, Inc., on behalf of Occidental Chemical Corporation (successor to Diamond Shamrock Chemicals Company, f/k/a Diamond Alkali Company)

February, 2001

9 Coltec Industries, Inc.

-A	August 21, 1996 Response of Coltec Industries, Inc. to EPA's 104(e) Information Request pertaining to the Diamond Alkali Superfund Site and Passaic River Study Area. Confirms certain corporate information and includes a statement that Crucible Materials Corporation acquired all interests in the former Crucible Steel in 1985 and is contractually "responsible for this matter." Also confirms the use of certain hazardous substances on site.
-B	April 10, 1970 Court filings in a suit brought by the Passaic Valley Sewerage Commission against Crucible Steel Corporation in the Superior Court of New Jersey indicating that Defendant allowed polluting material to be discharged into the Passaic River with supporting affidavits from facility witnesses attached.
-C	1971 Annual Report by the chief engineer to the Passaic Valley Sewerage Commission describing violations with back-up documentation attached.
-D	USEPA "Guides to Pollution Prevention" publications entitled, "Metal Casting and Heat Treating Industry," "The Fabricated Metal Products Industry," and "The Metal Finishing Industry," all identifying hazardous substances associated with operations as conducted on this site.
-E	Data from sediments adjacent to the facility indicating that the same types of substances known to be at the facility have been detected at significant levels in Passaic River sediments near the facility.
-F	NJDEP ECRA investigations documentation pertaining to hazardous substances on the site.
-G	July 26, 2000 New Jersey Department of the Treasury, Division of Revenue Status Report for Coltec Industries, Inc., formerly Colt Industries, Inc. and Crucible Materials Corporation.

11/5/2000 **GENERATOR: Coltec Industries, Inc. (as successor to Crucible Steel Company)**

EVIDENCE SUMMARY SHEET

(By shipment/disposal or collective group(s) of shipments/disposals)

Current Name, Mailing Address, and Telephone:

Coltec Industries, Inc.
430 Park Avenue
New York, NY 10022

cc: Crucible Materials Corporation
Attn: General Counsel
State Fair Blvd., P.O. Box 977
Syracuse, NY 13201-0977

References:
Coltec's Response to 104(e) request; including statement that Crucible Materials Corporation acquired all interests in the former Crucible Steel in 1985 and is contractually "responsible for this matter."

Facility location: 900 - 1000 South 4th Street (aka Frank E. Rodgers Blvd.), Harrison. See Site Location Map showing facility location in proximity to the Passaic River.

Date or time period of shipment(s) or disposal(s):

1900 - 1973, and subsequent to the extent contaminated soils or groundwater may have continued to contribute contaminants to the Passaic River from the facility.

1970 PVSC investigation and associated court testimony (by affidavits from facility witnesses); PVSC documents re violations.

Direct discharges: Underground drainage system underlying entire historical Crucible Steel facility complex, and which carried discharges of spent acid washings, spills, leaks, equipment washdowns as well as storm water, directly to the Passaic River, discharging through a 6'X6' box culvert.

Ground water: Facility is adjacent to the Passaic River so that contaminated ground water will be in contact with river water (tidal influence acknowledged by facility witnesses).

Surface water: Surface contamination to the Passaic River associated with surface runoff and through the storm drain network tying into the underlying drainage system. Facility witness acknowledges tidal influence into drainage system cleaning out previously contaminated silt.

Transporter: Not applicable.

Volume or quantity: Not susceptible to precise calculation due to irregular and intermittent nature of discharges. However, the same types of substances known to be at the Subject's facility have been detected at significant levels in Passaic River sediments near the Subject's facility.

PVSC investigation; steel industry and EPAbackground documents on metals industries waste streams; data from sediments adjacent to facility.

Name of Hazardous Substance(s) [and RCRA waste codes, if applicable] (See 40 CFR Sec. 302.4):

PCBs, Arsenic, Cadmium, Chromium, Copper, Lead, Mercury [U151], Nickel, Silver, Zinc, PAHs.

NJDEP ECRA investigation re Guyon Inc.

Substances like the generator's that are found in the Passaic River:

Many of the above were detected at significant levels in sediments in the vicinity of the Subject's facility. Analyses were not done for some.

Above references; Sediment data previously submitted to USEPA.

Name, Mailing Address and Telephone of Registered Agent:

The Corporation Trust Company
820 Bear Tavern Road
West Trenton, NJ 08628

Coltec's Response to 104(e) request; NJ Treasurer's Office.

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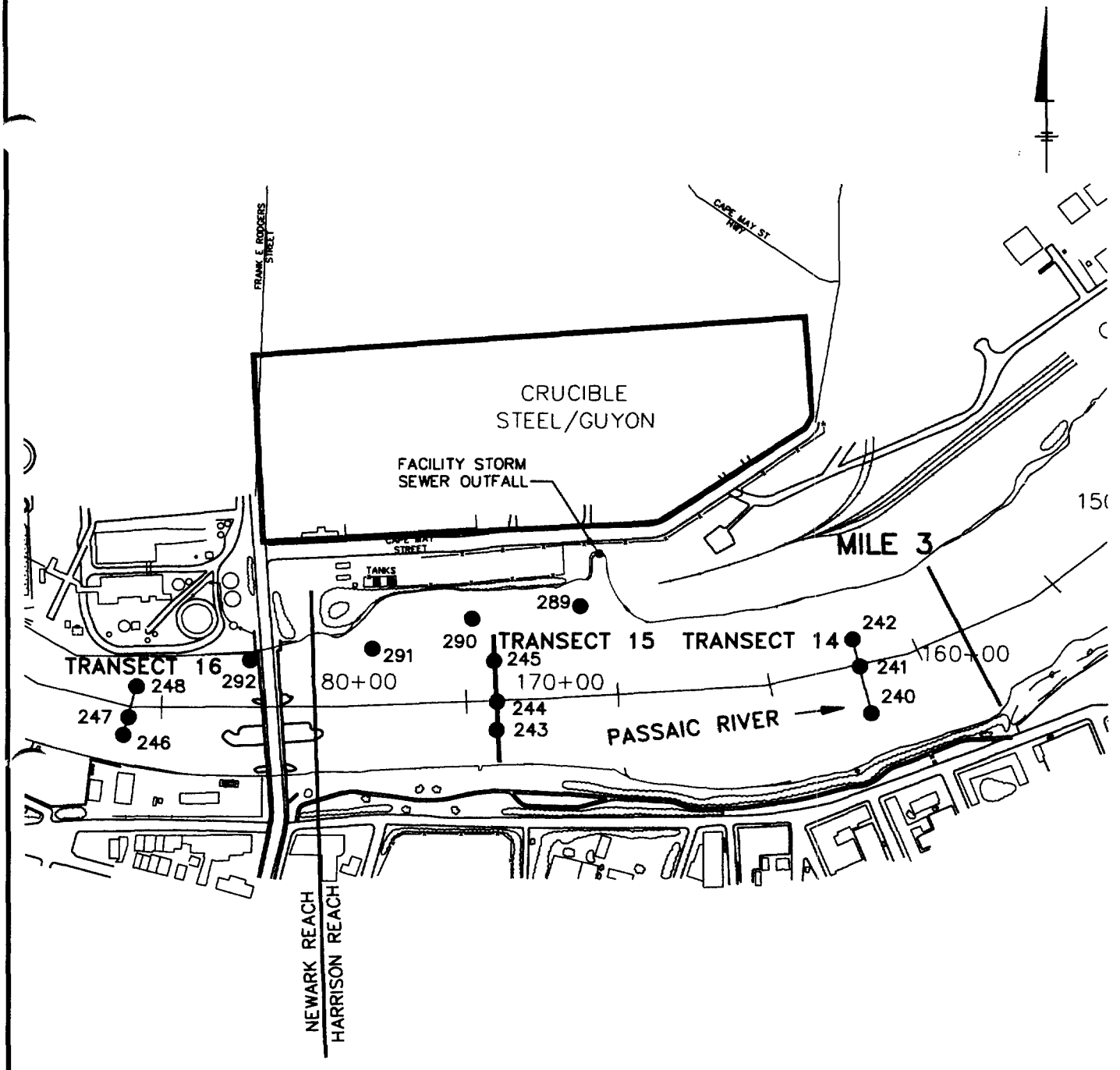

LEGEND:

- APPROXIMATE FACILITY BOUNDARY
- SHORELINE
- CSO OUTFALL
- RI SAMPLING TRANSECT
- 270 SEDIMENT SAMPLING LOCATION

DRAFT

0 500' 1000'

GRAPHIC SCALE

X: 09994X04.DWG, 09994X05.DWG
L: ON=*, OFF=REF, |GRID
P: STD-PCP/AP
10/6/00 SYR-54-GMS KMD SDL
09994023/09994813.DWG

SITE LOCATION MAP

CRUCIBLE STEEL/ GUYON FACILITY

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COLTEC INDUSTRIES, INC.

TAB A

August 21, 1996 Response of Coltec Industries, Inc. to EPA's 104(e) Information Request pertaining to the Diamond Alkali Superfund Site and Passaic River Study Area. Confirms certain corporate information and includes a statement that Crucible Materials Corporation acquired all interests in the former Crucible Steel in 1985 and is contractually "responsible for this matter." Also confirms the use of certain hazardous substances on site.

Coltec Industries

Coltec Industries Inc
430 Park Avenue
New York, NY 10022-3597

John R. Mayo
Assistant General Counsel
212/940-9639

August 21, 1996

Patricia Hick, Esq.
United States Environmental
Protection Agency
Region 2
290 Broadway
New York, NY 10007-1866

Re: Diamond Alkali Superfund Site - Passaic River Study Area

Dear Ms. Hick:

I write in response to your recent correspondence regarding the above-referenced site and as a follow-up to our telephone conversation of August 19, 1996. As you indicated in our telephone call, the Coltec entity allegedly involved with this site is the Crucible Steel Division. As I indicated, Coltec sold all interest in Crucible Steel to Crucible Materials Corporation ("CMC") in 1985. Under the terms of the Agreement, CMC would be responsible for this matter. All future correspondence in this matter should be forwarded directly to Harvey O. Simmons, III, General Counsel and Secretary of Crucible Materials Corporation at State Fair Boulevard, P.O. Box 977, Syracuse, New York 13201-0977. By copy of this letter, I am forwarding Mr. Simmons a copy of your August 8, 1996 correspondence which provides the initial background on this site.

Please do not hesitate to contact me if I can be of further assistance in regard to this matter.

Very truly yours,

John R. Mayo

JRM/ams
Enclosure

cc: Robert J. Tubbs, Esq.
Harvey O. Simmons, III, Esq.

AUG 23 1996

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Coltec Industries

Coltec Industries Inc
430 Park Avenue
New York, NY 10022-3597

John R. Mayo
Assistant General Counsel
212/940-9639

October 25, 1996

Mr. Lance Richman, P.G.
Emergency and Remedial Response
Division
United States Environmental
Protection Agency
290 Broadway, 19th Floor
New York, New York 10007-1866

Re: **Response to Request for Information Under 42 U.S.C. 9601, Diamond Alkali Superfund Site, Passaic River Study Area**

Dear Mr. Richman:

Please accept this correspondence as the response of Coltec Industries Inc ("Coltec") to the USEPA's request for information pursuant to Section 104 of CERCLA pertaining to the Diamond Alkali Superfund Site, Passaic River Study Area (the "Site"). Enclosed also please find the signed, notarized "Certification of Answers to Request for Information." Please note that in addition to conducting a search for relevant documents and interviewing former employees of Crucible Steel that worked at this facility, I have specifically requested that Crucible Materials Corporation ("CMC") conduct a similar investigation to determine if they have responsive information. (the corporate relationship between Crucible Steel, CMC and Coltec is addressed in response to question (1) below). As of the date of this letter, Coltec has not received a written response from CMC regarding the outcome of its investigation for responsive information.

In preparing these responses, interviews were conducted with: Charles Kurcina who was Vice President and General Manager of the facility from December 1971 through May 1973 (current address: Pittsburgh, Pennsylvania - phone: (412) 643-4978); Willard E. Soper, Jr. who was General Foreman of Heat Treat and held various other positions from June 1954 through May 1973 (current address: 104 Larned Road, Summit, New Jersey - phone: (908) 277-4260. Additionally, contact was made with Alan Simon who was Manager, Technical Services at the facility from November 1948 through May 1973. Since the initial contact with Mr. Simon Coltec has been unable to reach Mr. Simon. A telephone interview will be scheduled and this response will be supplemented in the event that said interview reveals additional responsive information.

Coltec responds to the information requests as follows:

Question No. 1 - This facility was operational in the early 1900's and eventually operated under the name Crucible Steel. Colt Industries Inc (now "Coltec") purchased Crucible Steel in 1968. This facility operated as one of the Crucible Steel Divisions of Coltec until this facility was closed in May of 1973. Coltec sold all interests in Crucible Steel to Crucible Materials Corporation in 1985.

Question No. 2 (a) - No.

(b) - No.

Question No. 3 - Of the materials listed in Question 3, the Crucible Steel Facility at 1000 South Fourth Street used the following:

(a) Chromium: to the extent that it was a constituent in the steel that was manufactured at the facility.

(b) Nickel: to the extent that it was a constituent in the steel that was manufactured at the facility.

(c) Molten lead was used in quenching baths as part of the steel manufacturing process.

Based upon current knowledge, Crucible did not use any of the other materials listed in Question 3 at this facility.

Question No. 4 (a) - Molten lead was used in quenching baths as part of the steel manufacturing process. Nickel and chromium were constituents of the steel (See 3(a) and (b) above).

(b) (i) See above.

(ii) During the quenching process lead would vaporize and as the vapors cooled lead oxide would be formed. The lead oxide was disposed of as solid waste (plant trash) off-site.

(iii) Some of the steel would go through acid treatment or pickling which would result in some dissolution of chrome, iron and nickel. The amount of chrome, iron and nickel which dissolved during the acid treatment/pickling process was minute in quantity. Following the acid treatment/pickling process the steel was run through a water rinse phase. During the water rinse phase small quantities of the chrome, iron and nickel dissolved during the acid treatment/pickling phase may have been released into the rinse water. It is believed that the rinse water was periodically discharged to the sanitary sewer system. Up until

approximately 1970 the rinsewater was discharged to the sanitary sewer with no neutralization. After approximately 1970 until facility closure the rinsewater was neutralized prior to discharge. The facility employees interviewed had no specific knowledge regarding disposal of the liquids in the acid treatment/pickling baths.

Question No. 5 -

(a) Maintenance Department - Charley Menzo, Arthur Wynn (no current addresses available for these employees).

(b) None recalled.

(c) None recalled. However raw acids were stored in stainless steel tanks at the facility.

(i) None recalled (no drums)

(ii) See (5)(c)(i) above.

(d) As indicated above, neutralization of rinse water was started in approximately 1970, and continued until the facility was closed in May 1973.

Question No. 6 (a)

(i) It is believed that the wastewater went to a sanitary sewer system, but the Passaic River Commission raised questions in the late 1960's or in 1970 whether the discharge went directly to the Passaic River. No records regarding these allegations have been located.

(ii) Yes, after 1970 (See above).

(iii) See above.

(iv) None available.

(b)(i),(ii) See 6(a)(i) above.

(c) (i) The employees interviewed have no recollection.

(ii), (iii), (iv) See (c)(i) above.

(d) No diagrams are available.

(e) See above, no other information available. As indicated above, the Passaic River Commission may have files responsive to this question.

Question No. 7 (a) Unable to estimate, no records available.

(b) Unknown.

(c) No records available. As indicated above, the Passaic River Commission may have files responsive to this question.

Question No. 8 (a) No, none recalled.

(b) None available.

Question No. 9 (a) No flooding is known to have occurred.

Question No. 10 - No available records. As indicated above, the Passaic River Commission may have files responsive to this question.

Question No. 11 - No such documents have been located.

Question No. 12 (a) Mr. Soper recalls that some air sampling was conducted, but no results are available. No other sampling is known to have occurred.

Question No. 13 (a) - See introductory paragraph and response to question (i) above. Upon closure of the facility it was sold to Spiegel Trucking, Inc. of Harrison, New Jersey. This transaction took place in March 1974. Documentation regarding this transaction has just been received from off-site storage. This response will be supplemented in the event that review of said documents reveals additional responsive information.

Question No. 14 (a) Coltec Industries Inc

(b) John W. Guffey, Jr.
President and Chairman of the Board
Coltec Industries Inc
3 Coliseum Centre
2550 West Tyvola Road
Charlotte, NC 28217

(c) Pennsylvania

- agent for service of process in Pennsylvania:

c/o CT Corporation System
3 Gateway Center
16th Floor - West Wing
Pittsburgh, PA 15222

- agent for service of process in New Jersey:

The Corporation Trust Company
Bear Tavern Road
West Trenton, NJ 08628

(d) Copy enclosed

(e) See attached list

(f) See item (e)
(g) See item (e)

(h) See item (e)

(i) Coltec Industries Inc is a public company listed on the New York Stock Exchange

Question No. 15 - The following employee of Coltec answered this "Request for Information":

John R. Mayo
Assistant General Counsel
Coltec Industries Inc
430 Park Avenue
New York, New York 10022
(212) 940-9639

The following employee of Coltec assisted in answering this "Request for Information":

Donald E. O'Keefe
Assistant General Counsel
Coltec Industries Inc
430 Park Avenue
New York, New York 10022
(212) 940-0573

As indicated above, Coltec is continuing its investigation into this matter and will supplement its responses hereto as required by CERCLA.

Please do not hesitate to call with any questions or comments regarding the above.

Very truly yours,

John R. Mayo

JRM:vm

cc: Robert J. Tubbs, Esq.
Christopher B. Sheehey, Esq.

Documents Responsive to Question 14

Microfilm Number _____ Filed with the Department of State on NOV 26 1991

Entity Number 629595 Linda K. Whitehill

Acting Secretary of the Commonwealth

ARTICLES OF AMENDMENT-DOMESTIC BUSINESS CORPORATION

DSCB:15-1915 (Rev 89)

In compliance with the requirements of 15 Pa.C.S. § 1915 (relating to articles of amendment), the undersigned business corporation, desiring to amend its Articles, hereby states that:

The name of the corporation is: Coltec Industries Inc

The (a) address of this corporation's current registered office in this Commonwealth or (b) commercial registered office provider and the county of venue is (the Department is hereby authorized to correct the following address to conform to the records of the Department):

c/o CT Corporation System, Oliver Bldg, Mellon Square, Pittsburgh, PA 15222 Allegheny

Number and Street City State Zip County

Name of Commercial Registered Office Provider County

For a corporation represented by a commercial registered office provider, the county in (b) shall be deemed the county in which the corporation is located for venue and official publication purposes.

The statute by or under which it was incorporated is: Act of the General Assembly approved May 5, 1933 (P.L. 364) as amended

The original date of its incorporation is: March 12, 1976

(Check, and if appropriate complete, one of the following):

X The amendment shall be effective upon filing these Articles of Amendment in the Department of State.

___ The amendment shall be effective on: _____

(Check one of the following):

X The amendment was adopted by the shareholders pursuant to 15 Pa.C.S. § 1914(a) and (b).

___ The amendment was adopted by the board of directors pursuant to 15 Pa.C.S. § 1914 (c).

(Check, and if appropriate complete, one of the following):

___ The amendment adopted by the corporation, set forth in full, is as follows:

X The amendment adopted by the corporation as set forth in full in Exhibit A, attached hereto and made a part hereof.

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DSCB:15-1915 (Rev 89)-2

3. (Check if the amendment restates the Articles):

__X__ The restated Articles of Incorporation supersede the original Articles and all amendments thereto.

IN TESTIMONY WHEREOF, the undersigned corporation has caused these Articles of Amendment to be signed by a duly authorized officer thereof this 25th day of November, 1991.

Coltec Industries Inc
(Name of Corporation)

BY: Donald E O'Keefe
(Signature)

Donald E. O'Keefe

TITLE: Assistant Secretary

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AMENDED AND RESTATED ARTICLES OF INCORPORATION
OF
COLTEC INDUSTRIES INC

ARTICLE FIRST

The name of the corporation (herein called the "Corporation") is:

Coltec Industries Inc

ARTICLE SECOND

The location and post office address of its registered office in this Commonwealth is c/o CT Corporation System, Oliver Building, Mellon Square, Pittsburgh, Pennsylvania 15222.

ARTICLE THIRD

The Corporation is organized under the provisions of the Pennsylvania Business Corporation Law of 1988 (the "BCL") for the following purposes, which shall be construed independently of each other:

(a) To carry on in all its branches a general manufacturing business in ferrous, non-ferrous and alloyed metals and any other materials;

(b) To buy, sell, lease, mine, manufacture, produce, extract, manage, operate, hold and deal in and with real and personal property of every kind and description;

(c) To engage in merchantile manufacturing, processing, research, development, trading and service businesses of any kind and character; and

(d) To invest in, and to aid by loans, by making guarantees and in any other manner, any business enterprises affiliated with this Corporation, or in which this Corporation has any direct or indirect interest or with which this Corporation does business, or the business of which is a direct or indirect benefit to this Corporation.

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The Corporation shall also have as its purpose the engaging in all lawful business for which the Corporation may be incorporated.

The term for which the Corporation is to exist is perpetual.

ARTICLE FOURTH

The aggregate number of shares which the Corporation shall have authority to issue 102,500,000 of which 2,500,000 shares shall be Preferred Stock, par value $.01 per share, issuable in one or more series, and 100,000,000 shares shall be Common Stock, par value $.01 per share.

The Board of Directors shall have the full authority permitted by law to fix by resolution full, limited, multiple or fractional, or no voting rights, and such designations, preferences, qualifications, privileges, limitations, restrictions, options, conversion rights, and other special or relative rights of any class or any series of any class that may be desired.

ARTICLE FIFTH

The shareholders of the Corporation shall not have the right to cumulate their votes for the election of directors of the Corporation.

ARTICLE SIXTH

Any action required or permitted to be taken at any annual or special meeting of shareholders may be taken only upon the vote of the shareholders at an annual or special meeting duly noticed and called, as provided in the By-laws of the Corporation, and may not be taken by a written consent of the shareholders.

Special meetings of the shareholders of the Corporation for any purpose or purposes may be called at any time by the the Chairman of the Board of Directors or by a majority of the members of the Board of Directors. Special meetings of shareholders of the Corporation may not be called by any other Person or Persons.

ARTICLE SEVENTH

(A) Director Liability

A director shall not, as such, be personally liable for monetary damages for any action taken, or any failure to take any action, unless the director has breached or failed to perform the duties of his office under Subchapter 17B of the BCL, as the same may be amended from time to time, and the breach or failure to perform constitutes self-dealing, willful misconduct or recklessness. The provisions of this Section (A) shall not apply to the responsibility or liability of a director pursuant to any criminal statute, or the liability of a director for the payment of taxes pursuant to local, state or Federal law.

(B) Indemnification

The Corporation shall indemnify any person who was or is a party or is threatened to be made a party to any threatened, pending or completed action, suit or proceeding, whether civil, criminal, administrative or investigative, whether formal or informal, and whether brought by or in the right of the Corporation or otherwise, by reason of the fact that he was a director, officer or employee of the Corporation (and may indemnify any person who was an agent of the Corporation), or a person serving at the request of the Corporation as a director, officer, partner, fiduciary or trustee of another corporation, partnership, joint venture, trust, employee benefit plan or other enterprise, to the fullest extent permitted by law, including without limitation indemnification against expenses (including attorneys' fees and disbursements), damages, punitive damages, judgments, penalties, fines and amounts paid in settlement actually and reasonably incurred by such person in connection with such proceeding, unless the act or failure to act giving rise to the claim for indemnification is finally determined by a court to have constituted willful misconduct or recklessness.

The Corporation shall pay the expenses (including attorneys' fees and disbursements) actually and reasonably incurred in defending a civil or criminal action, suit or proceeding on behalf of any person entitled to indemnification under the paragraph appearing immediately prior hereto in advance of the final disposition of such

proceeding upon receipt of an undertaking by or on behalf of such person to repay such amount if it shall ultimately be determined that he is not entitled to be indemnified by the Corporation, and may pay such expenses in advance on behalf of any agent on receipt of a similar undertaking. The financial ability of such person to make such repayment shall not be a prerequisite to the making of an advance.

For purposes of this Section (B) (i) the Corporation shall be deemed to have requested an officer, director, employee or agent to serve as fiduciary with respect to an employee benefit plan where the performance by such person of duties to the Corporation also imposes duties on, or otherwise involves services by, such person as a fiduciary with respect to the plan, (ii) excise taxes assessed with respect to any transaction with an employee benefit plan shall be deemed "fines" and (iii) action taken or omitted by such person with respect to an employee benefit plan in the performance of duties of a purpose reasonably believed to be in the interest of the participants and beneficiaries of the plan shall be deemed to be for a purpose which is not opposed to the best interests of the Corporation.

To further effect, satisfy or secure the indemnification obligation provided herein or otherwise, the Corporation may maintain insurance, obtain a letter of credit, act as self-insurer, create a reserve, trust, escrow, cash collateral or other fund or account, enter into indemnification agreements, pledge or grant a security interest in any assets or properties of the Corporation, or use any other mechanism or arrangement whatsoever in such amounts, at such costs, and upon such other terms and conditions as the Board of Directors shall deem appropriate.

All rights of indemnification under this Section (B) shall be deemed a contract between the Corporation and the person entitled to indemnification under this Section (B) pursuant to which the Corporation and each such person intend to be legally bound. Any repeal, amendment or modification hereof shall be prospective only and shall not limit, but may expand, any rights or obligations in respect of any proceeding whether commenced prior to or after such change to the extent such proceeding pertains to actions or failures to act occurring prior to such change.

The indemnification, as authorized by this Section (B), shall not be deemed exclusive of any other rights to which those seeking indemnification or advancement of expenses may be entitled under any statute, agreement, vote of shareholders, or disinterested directors or otherwise, both as to action in an official capacity and as to action in any other capacity while holding such office. The indemnification and advancement of expenses provided by, or granted pursuant to, this Section (B) shall continue as to a person who has ceased to be an officer, director, employee or agent in respect of matters arising prior to such time, and shall inure to the benefit of the heirs, executors and administrators of such person.

ARTICLE EIGHTH

Subchapter 25E and Subchapters 25G through 25J of the BCL shall not be applicable to the Corporation.

Subchapter 25F and all other provisions of the BCL which have not been rendered inapplicable to the Corporation by the first paragraph of this Article Eighth shall be applicable to the Corporation.

ARTICLE NINTH

These Amended and Restated Articles of Incorporation may be amended in any manner now or hereafter prescribed by statute, and all rights conferred upon shareholders herein are granted subject to this reservation.

Microfilm Number _____

Filed with the Department of State on NOV 19 1993

Entity Number 629585

Secretary of the Commonwealth

STATEMENT OF CHANGE OF REGISTERED OFFICE BY AGENT

DSCB:15-164 (Rev 90)

In compliance with the requirements of 15 Pa.C.S. § 108 (relating to change in location or status of registered office provided by agent), the undersigned person who maintains the registered office of an association and who desires to change the following with respect to such agency hereby states that:

1. The name of the association represented by the undersigned person is:

COLTEC INDUSTRIES INC.

2. The address of the present registered office in this Commonwealth of the above-named association is:

c/o C T Corporation System, Oliver Bldg., Mellon Square, Pittsburgh, Pa. 15222 Allegheny

Number and Street | City | State | Zip | County

3. (If the registered office address is to be changed, complete athe following):

The registered office in this Commonwealth of the above-named association shall be provided by:

c/o C T Corporation System, Allegheny County
as a commercial registered office provider

4. The name of the person in care of the foregoing office is: N/A

The person named immediately above this paragraph has been designated in fact as the agent in care of the registered office in the Commonwealth of Pennsylvania of the association named in paragraph 1 of this statement.

5. (Check one or more of the following, as appropriate):

___This statement reflects a change in the name of the agent.
_X_The change in registered office set forth in this statement reflects the removal of the place of business of the agent to a new location.
___The status of the agent as the provider of the registered office of the above-named association has been terminated.

IN TESTIMONY WHEREOF, the undersigned person has caused this Statement of Change of Registered Office by Agent to be signed this 15th day of November, 19 93.

C T CORPORATION SYSTEM

BY: Kenneth J. Uva
Kenneth J. Uva

TITLE: Vice-President

PA Dept. of State
NOV 19 93

AD A000122

876970020

DEC 27 1993

Microfilm Number _____ Filed with the Department of State on _____

Entity Number 62785

_____
Secretary of the Commonwealth

ARTICLES OF MERGER-DOMESTIC BUSINESS CORPORATION

DSCB:15-1926 (Rev 94)

In compliance with the requirements of 15 Pa.C.S. § 1926 (relating to articles of merger or consolidation), the undersigned business corporations, desiring to effect a merger, hereby state that:

1. The name of the corporation surviving the merger is: Coltec Industries Inc

2. (Check and complete one of the following):

X The surviving corporation is a domestic business corporation and the (a) address of its current registered office in this Commonwealth or (b) name of its commercial registered office provider and the county of venue is (the Department is hereby authorized to correct the following information to conform to the records of the Department):

(a) _____
Number and Street City State Zip County

(b) c/o: CT Corporation System, Allegheny
Name of Commercial Registered Office Provider County

For a corporation represented by a commercial registered office provider, the county in (b) shall be deemed the county in which the corporation is located for venue and official publication purposes.

___ The surviving corporation is a qualified foreign business corporation incorporated under the laws of _____ and the (a) address of its current registered office in this Commonwealth or (b) name of its commercial registered office provider and the county of venue is (the Department is hereby authorized to correct the following information to conform to the records of the Department):

(a) _____
Number and Street City State Zip County

(b) c/o: _____
Name of Commercial Registered Office Provider County

For a corporation represented by a commercial registered office provider, the county in (b) shall be deemed the county in which the corporation is located for venue and official publication purposes.

___ The surviving corporation is a nonqualified foreign business corporation incorporated under the laws of _____ and the address of its principal office under the laws of such domiciliary jurisdiction is:

_____
Number and Street City State Zip County

3. The name and the address of the registered office in this Commonwealth or name of its commercial registered office provider and the county of venue of each other domestic business corporation and qualified foreign business corporation which is a party to the plan of merger are as follows:

Name of Corporation	Address of Registered Office or Name of Commercial Registered Office Provider	County
	NONE	

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PA DEPT OF STATE PA DEPT OF STATE

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DSCB:15-1926 (Rev 90)-2

4. (Check, and if appropriate complete, one of the following):

___The plan of merger shall be effective upon filing these Articles of Merger in the Department of State.

X The plan of merger shall be effective on: December 31, 1991 4:30 p.m.
Date Hour

5. The manner in which the plan of merger was adopted by each domestic corporation is as follows:

Name of Corporation | Manner of Adoption

Colter Industries Inc | Approved by action of the board of directors of the corporation pursuant to 15 Pa. C.S. Paragraph 1924(b)(2)

6. (Strike out this paragraph if no foreign corporation is a party to the merger). The plan was authorized, adopted or approved, as the case may be, by the foreign business corporation (or each of the foreign business corporations) party to the plan in accordance with the laws of the jurisdiction in which it is incorporated.

7. (Check, and if appropriate complete, one of the following):

X The plan of merger is set forth in full in Exhibit A attached hereto and made a part hereof.

___Pursuant to 15 Pa.C.S. § 1901 (relating to omission of certain provisions from filed plans) the provisions, if any, of the plan of merger that amend or constitute the operative Articles of Incorporation of the surviving corporation as in effect subsequent to the effective date of the plan are set forth in full in Exhibit A attached hereto and made a part hereof. The full text of the plan of merger is on file at the principal place of business of the surviving corporation, the address of which is:

Number and Street | City | State | Zip | County

IN TESTIMONY WHEREOF, the undersigned corporation or each undersigned corporation has caused these Articles of Merger to be signed by a duly authorized officer thereof this 20 day of December 19 91

COLTER INDUSTRIES INC
(Name of Corporation)
By: [signature]
(Signature)
TITLE: Senior Vice President and Secretary

CFPI INC
(Name of Corporation)
By: [signature]
(Signature)
TITLE: President

CFPH INC
(Name of Corporation)
By: [signature]
(Signature)
TITLE: Vice President

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DSCB:15-1926 (Rev 90)-2

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EXHIBIT A

Plan of Merger

CFPI Inc and CPFM Inc, each a Delaware corporation, hereby merge into and with Coltec Industries Inc, a Pennsylvania corporation ("Coltec"), the surviving corporation, pursuant to Subchapter C. of Chapter 9 of the Pennsylvania Business Corporation Law of 1988. The issued and outstanding shares of CFPI Inc and CPFM Inc shall not be converted or exchanged but shall be cancelled and surrendered, and no shares of the surviving corporation shall be issued in exchange therefor. The issued and outstanding shares of the surviving corporation shall not be changed.

(1) At the Effective Time of the Merger, the Restated Articles of Incorporation and the by-laws of Coltec, as in effect at the Effective Time of the Merger, shall continue as the Restated Articles of Incorporation and the by-laws, respectively, of the Surviving Corporation until amended as provided by law, and the directors and the officers of Coltec at the Effective Time of the Merger shall be the directors and the officers, respectively, of the Surviving Corporation until their respective successors are duly elected or appointed and qualified in the manner provided by the Restated Articles of Incorporation and by-laws of the Surviving Corporation or as otherwise provided by law;

(2) Each share of Common Stock of CFPI Inc which is owned by CII Holdings Inc and each share of Common Stock of CPFM Inc which is owned by CFPI Inc and which is outstanding immediately prior to the Effective Time of the Merger shall, by virtue of the Merger and without any action on the part of Coltec, cease to exist;

(3) Each share of Common Stock, par value $.01 per share, of Coltec outstanding at the Effective Time of the Merger shall remain issued and outstanding as one validly issued, fully paid and nonassessable share of Common Stock, par value $.01 per share, of the Surviving Corporation;

(4) At and after the Effective Time of the Merger, transfer of the shares of Common Stock of CFPI Inc and CPFM Inc outstanding prior to the Effective Time of the Merger shall not be made on the stock transfer books of said corporations, and all certificates for such shares shall forthwith be cancelled;

(5) At the Effective Time of the Merger, the Surviving Corporation shall possess all the assets and property of every description, and every interest therein, wherever located, and all the rights, privileges, immunities, powers, franchises and authority, of a public as well as a private nature, of each of

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the Constituent Corporations, and all obligations belonging to or due any of them, shall be vested in the Surviving Corporation without further act or deed, and title to any real estate or any interest therein in any of the Constituent Corporations shall not revert or in any way be impaired by reason of the Merger; and

(6) As of the Effective Time of the Merger the assets and liabilities of Coltec and CFPI Inc and CPFM Inc shall be taken up or continued, as the case may be, on the books of the Surviving Corporation in amounts determined in accordance with generally accepted accounting principles by the Board of Directors of the Surviving Corporation;

(7) The Effective Time of the Merger shall be December 31, 1993 at 4:30 p.m.

COLTEC INDUSTRIES INC

By _____
Senior Vice President

ATTEST:

By _____
Assistant Secretary

CFPI INC

By _____
President

ATTEST:

By _____
Secretary

CPFM INC

By _____
Vice President

ATTEST:

By _____
Assistant Secretary

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COMMONWEALTH OF PENNSYLVANIA

DEPARTMENT OF STATE

FEBRUARY 23, 1996

TO ALL WHOM THESE PRESENTS SHALL COME, GREETING:

COLTEC INDUSTRIES INC

I, Yvette Kane, Secretary of the Commonwealth of Pennsylvania do hereby certify that the foregoing and annexed is a true and correct photocopy of Articles of Amendment restating the Articles of Incorporation in their entirety and all amendments
which appear of record in this department.

SECRETARY OF THE COMMONWEALTH
PENNSYLVANIA

IN TESTIMONY WHEREOF, I have hereunto set my hand and caused the Seal of the Secretary's Office to be affixed, the day and year above written.

ADA000127

Yvette Kane
Secretary of the Commonwealth

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CERTIFICATION OF ANSWERS TO REQUEST FOR INFORMATION

State of New York :

County of New York :

I certify under penalty of law that I have personally examined and am familiar with the information submitted in this document (response to EPA Request for Information) and all documents submitted herewith, and that based on my inquiry of those individuals immediately responsible for obtaining the information, I believe that the submitted information is true, accurate, and complete, and that all documents submitted herewith are complete and authentic unless otherwise indicated. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment. I am also aware that my company is under a continuing obligation to supplement its response to EPA's Request for Information if any additional information relevant to the matters addressed in EPA's Request for Information or the company's response thereto should become known or available to the company.

John R. Mayo
NAME (print or type)

Assistant General Counsel
TITLE (print or type)

John R. Mayo
SIGNATURE

Sworn to before me this 25th
day of October, 1996

Veronica McCartan
Notary Public

VERONICA McCARTAN
Notary Public, State of New York
No. 31-7794225
Qualified in New York County
Commission Expires Aug 31, 1998

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COLTEC INDUSTRIES INC AND SUBSIDIARIES

RECORD OWNERS

	State of Incorporation	Percentage of Voting Securities Owned
1. Coltec Industries Inc	Pennsylvania	---
2. CII Holdings Inc	Delaware	100
2.1 Coltec Canada Inc	Delaware	89*
2.1.1 Coltec Aerospace Canada Ltd	Canada	100
2.1.1.1 Menasco-Krosno Ltd.	Poland	73
3. Coltec Industries International Inc.	Barbados	100
4. Delavan Inc	Iowa	100
4.1 Delavan-Delta, Inc.	Tennessee	100
4.2 Walbar Inc	Delaware	100
5. Garlock Inc	Ohio	100
5.1 Garlock Bearings Inc	Delaware	80
5.2 Garlock de Mexico, S.A. de C.V.	Mexico	65.7
5.3 Garlock of Canada Ltd.	Ontario, Canada	100
5.4 Garlock Overseas Corporation	Delaware	100
5.4.1 Garlock International Inc	Delaware	100

*remaining 11% owned by Walbar Inc

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5.4.2 Stemco Truck Products Pty. Limited	Australia	100
5.5 Garlock Pty. Limited	Australia	80
5.6 Garlock S.A.	Panama	100
5.7 Louis Mulas Sucs, S.A. de C.V.	Mexico	65.7
5.8 Stemco Inc	Texas	100
5.9 The Anchor Packing Company	Delaware	100
5.10 Coltec Industrial Products Inc	Delaware	100
6. Garrison Litigation Management Group, Ltd	Rhode Island	100
7. Coltec Technical Services Inc	Delaware	100
8. Apollo Insurance Company	Vermont	100
9. Salt Lick Railroad Company	Pennsylvania	100
10. Coltec Holdings Inc.	Delaware	100
11. Menasco Aerosystems Inc	Delaware	100
12. Coltec (Great Britain) Limited	United Kingdom	100
12.1 Delavan Limited	United Kingdom	100
12.1.1 Delavan European Marketing Company Limited	United Kingdom	100
12.2 Garlock (Great Britain) Limited	United Kingdom	100
12.3 Holley Automotive Group Limited	United Kingdom	100

13. Holley Performance Products Inc	Delaware	100
14. Holley Automotive Inc	Delaware	100
15. Farnam Sealing Systems Inc	Delaware	100
16. Coltec Automotive Inc	Delaware	100
17. Holley Automotive Systems GmbH	Germany	100
17.1 Garlock GmbH	Germany	100
17.1.1 Liard S.A.	France	100
18. Coltec International Services Co.	Delaware	100
19. Coltec Industries Pacific Pte Ltd	Singapore	100

B

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COLTEC INDUSTRIES, INC.

TAB B

April 10, 1970 Court filings in a suit brought by the Passaic Valley Sewerage Commission against Crucible Steel Corporation in the Superior Court of New Jersey indicating that Defendant allowed polluting material to be discharged into the Passaic River with supporting affidavits from facility witnesses attached.

C-2403 -69

DOCKETED
MAY 5 1970

FILED
MAY 4 1970
JOHN F. LYNCH
J.S.C.

PAID
MAY 5 1970
FINANCE DEPT.

RECEIVED
MAY 5 1970
JOHN F. LYNCH
J.S.C.

Thomas E. Durkin, Jr.,
Attorney for Plaintiff
24 Branford Place
Newark, New Jersey
623-5142

C-2403 -69

SUPERIOR COURT OF NEW JERSEY
CHANCERY DIVISION - HUDSON COUNTY
DOCKET NO.

P-66

PASSAIC VALLEY SEWERAGE COMMISSIONERS, a public corporation,

PLAINTIFF,

-vs-

CRUCIBLE STEEL CORPORATION OF AMERICA, SHALDING WORKS, 1000 South Fourth Street Harrison, New Jersey,

DEFENDANT

CIVIL ACTION

COMPLAINT

Plaintiff, Passaic Valley Sewerage Commissioners, a public corporation, having its principal office in the City of Newark, County of Essex, and State of New Jersey, says that:

1. Plaintiff is a body corporate and politic, created, organized and existing under and by virtue of the laws of the State of New Jersey.

2. Plaintiff is vested with full power and authority and is charged with the duty to prevent the pollution of the Passaic River and its tributaries, and has full power and authority to sue, which said powers and duties are defined, granted and imposed under the laws of the State of New Jersey,

as set forth in the Revised Statutes of New Jersey, 1937, Title 58, Chapter 14, as supplemented and amended.

3. Plaintiff further shows that pursuant to the power and authority vested in it, under and by virtue of the statute aforesaid, the plaintiff, acting under contract with certain municipalities within the Passaic Valley Sewerage Commissioners' District, as defined by law, constructed a sewerage system and disposal works for the intercepting and disposal of sewage or other polluting matter, in order to free said river and its tributaries from pollution; and put said system into operation on or about the 2nd day of August, 1924, which said system of sewerage and disposal works has ever been and still is in operation, being operated by plaintiff.

Under certain of the provisions of said law, i.e., N.J.S.A. 58:14-7, it is provided:

"No sewage or other polluting matter shall be discharged directly or indirectly, into the waters of the Passaic River at any point between the Great Falls in the City of Paterson and the mouth of said river at Newark Bay, or into the waters of any of the tributaries of said river which empty into it between said points, and the Commissioners may enforce the provisions of this chapter over and throughout all municipalities which may, or the inhabitants of which may, directly or indirectly discharge sewage or other polluting matter into said waters. The Commissioners may institute in their corporate name such civil actions as may be deemed necessary or appropriate to enforce the provisions of this section, and the Superior Court is hereby vested with jurisdiction to enforce said provisions by such actions brought by the Commissioners. The Court may proceed in such actions in a summary manner or otherwise. As amended L. 1953, c. 54, p. 963, s. 32."

and in N.J.S.A. 58:14-8, it is provided:

"No sewage, waste matter, article or substance, liquid or solid, of any kind which creates odors, gases or fumes, due to the putrefaction of organic matter or the presence of chemicals, or results in the presence of oil or grease on the surface of the waters of the Passaic River, or its tributaries, shall be placed or discharged, or be permitted to be placed or discharged, into the waters of said river between the points designated in section 58:14-7 of this title, or into its tributaries so designated. Whoever, other than a municipal corporation, after not less than ten days' nor more than six months' notice by the Commissioners, violates the provisions of this section shall be liable to a

penalty of one hundred dollars, and a further penalty of twenty-five dollars a day for each day the offense is continued, to be sued for and recovered by and in the name of the Commissioners."

5. The Defendant, Crucible Steel Corporation of America, maintains an industry in the Town of Harrison, County of Hudson, and State of New Jersey. For some time past, and continuing up to this time, with no present indication of abatement thereof, said Defendant has allowed polluting material to be discharged into the Passaic River between the Great Falls in Paterson and the mouth of said river at Newark Bay, through a culvert owned by said Defendant. The said polluting material contains, among other things, oil, imparting to the river a disagreeable appearance and odor. The said polluting material has been and is now being discharged through the culvert owned by the Defendant in the manner aforesaid, and will continue to be so discharged unless the said Defendant, Crucible Steel Corporation of America, is enjoined and restrained by order and judgment of this court.

6. All of the foregoing has constituted and now constitutes pollution of a very serious character contrary to and in violation of the statute aforesaid.

WHEREFORE, Plaintiff demands judgment enjoining and restraining the Defendant, Crucible Steel Corporation of America, Spalding Works, 1000 South Fourth Street, Harrison, New Jersey, its officers, agents, servants and employees from allowing a discharge into the Passaic River, of any matter or substance, liquid or solid, prohibited by N.J.S.A. 58:14-7 and 58:14-8.

Thomas E. Durkin, Jr.,
Attorney for Plaintiff

STATE OF NEW JERSEY

COUNTY OF ESSEX

VERIFICATION

Seymour A. Lubetkin, being of full age, duly sworn upon his oath, deposes and says:

1. I am the Chief Engineer for the Passaic Valley Sewerage Commissioners and have been so employed for approximately fifteen years, next immediately preceding.

2. I have read the foregoing complaint and I am familiar with the contents thereof and know the same to be true.

Seymour A. Lubetkin

Seymour A. Lubetkin,
Chief Engineer

Sworn and subscribed before me, a Notary Public, in and for the County of Essex, State of New Jersey, on this 10 day of April, 1970.

Louis J. Capone

LOUIS J. CAPONE
NOTARY PUBLIC OF NEW JERSEY
My Commission Expires Mar. 2, 1971

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STATE OF NEW JERSEY

COUNTY OF ESSEX

AFFIDAVIT

1. I, Seymour A. Lubetkin, am the Chief Engineer for the Passaic Valley Sewerage Commissioners and have been so employed for approximately fifteen years, next immediately preceding.

2. In my official capacity as Chief Engineer, I have received numerous reports from the Commissioners' River Inspectors reporting the discharge of prohibited matters into the Passaic River through a culvert owned by the Defendant, Crucible Steel Corporation of America, and on January 16, 1970, and again on February 4, 1970, by certified mail, I instructed the Defendant to cease and desist polluting.

3. The discharge of the complained of effluent is highly polluting to the Passaic River.

Seymour A. Lubetkin

Seymour A. Lubetkin
Chief Engineer

Sworn and subscribed before me, a Notary Public, in and for the County of Essex, State of New Jersey, on this 10th day of April, 1970.

LOUIS J. CAPONE
NOTARY PUBLIC OF NEW JERSEY
My Commission Expires May 2, 1971

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Filing Fee $20.00

PAID JUN 2 1970

RECD MAY 25 1970

FILED MAY 25 1970

SIMON, DENSTMAN & NOONAN
11 COMMERCE STREET
NEWARK, N. J. 07102
(201) 643-2626
ATTORNEYS FOR Defendant

P-61

SUPERIOR COURT OF NEW JERSEY
CHANCERY DIVISION-HUDSON COUNTY
DOCKET NO. C C -2403-69

PASSAIC VALLEY SEWERAGE COMMISSIONERS, a public corporation,

Plaintiff,

v.

CRUCIBLE STEEL CORPORATION OF AMERICA, SPALDING WORKS, 1000 South Fourth Street, Harrison, New Jersey,

Defendant.

Civil Action

ANSWER

Defendant, Crucible, Inc., a corporation of the State of New Jersey, (denominated in the complaint as Crucible Steel Corporation of America, "Spalding Works"), whose Post Office address is 1000 So. Fourth Street, Harrison, County of Hudson and State of New Jersey, answering the complaint, says that:

1. Paragraph 1 is admitted.

2. Answering Paragraph 2, defendant admits that plaintiff is charged by statutes, in such case made and provided, with certain duties in respect to preventing pollution of the Passaic River and its tributories, but for the true meaning and

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purport thereof, and for the extent to which the same define and prescribe said duties reposed upon it, defendant refers plaintiff to the language of said statutes. Except as expressly herein admitted, Paragraph 2 is denied.

3. Answering Paragraph 3, defendant states that it does not have knowledge or information sufficient to form a belief concerning the allegations therein contained, respecting plaintiff's construction and operation of a sewage system and disposal works. Further answering said Paragraph, defendant contends that the provisions of N.J.S.A. 58:14-8, which prescribe the circumstances under which civil penalties are recoverable, are not applicable to this civil action, which is an action to secure an injunction.

4. Answering Paragraph 5, (the complaint containing no Paragraph numbered "4"), defendant denies that it does now or has in the past, discharged or allowed the discharge of polluting material into the Passaic River. It admits that it maintains an industry in the Town of Harrison, New Jersey. It admits that beneath the surface of the lands upon which it maintains said industry, there is, and for many years has been a drainage pipe which terminates and discharges into said river. All other allegations in said Paragraph not herein expressly mentioned, are denied.

5. Paragraph 6 is denied.

AFFIRMATIVE DEFENSE

Said drainage pipe alluded to in Paragraph 4 hereinabove also runs and extends beneath lands owned and used by others abutting upon and also near and in the general area of the premises on which defendant maintains its said industry. Said

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drainage pipe is part of a storm sewer or storm drainage system. Said system also includes numerous manholes, situated not only on the premises occupied by defendant but also upon said other lands owned and used by others. Surface water is collected in said manholes and is conducted into said drainage pipe through many lateral pipes connected thereto and, ultimately, discharged therefrom into the Passaic River. Said lateral pipes run and operate not only beneath the premises occuped by defendant as aforesaid, but beneath the lands owned and used by many others. Defendant contends that if polluting material has been or is being discharged into said river through drainage pipes, as plaintiff alleges, than the discharge thereof is being caused or allowed by other users of said storm drainage system and not by plaintiff.

SIMON, DENSTMAN & NOONAN,
Attorneys for defendant
CRUCIBLE, INC.,
by
SAM DENSTMAN
A Member of the Firm

We hereby certify that the foregoing pleading was served within the time allowed by Rule 4:6-1 of the Civil Practice Rules.

SIMON, DENSTMAN & NOONAN,
Attorneys for defendant
CRUCIBLE, INC.
by
SAM DENSTMAN
A Member of the Firm

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STATE OF NEW JERSEY :
: S S
COUNTY OF E S S E X :

SYLVIA SAROS, of full age, being duly sworn according to law upon her oath deposes and says:

1. I am a secretary in the law offices of Simon, Denstman & Noonan, Esqs., 11 Commerce Street, Newark, New Jersey.

2. On May 22, 1970, I served a copy of the within Answer upon Thomas E. Durkin, Jr., attorney for plaintiff, 24 Branford Place, Newark, New Jersey, by enclosing said copy in an envelope addressed to said attorney, and by depositing said envelope, with postage thereon pre-paid, in the United States mail, at 11 Commerce Street, Newark, New Jersey.

SUBSCRIBED AND SWORN TO :
BEFORE ME THIS 22d DAY :
OF MAY, 1970. :

Sylvia Saros
SYLVIA SAROS

Joan E. Molnar
JOAN E. MOLNAR
Notary Public of New Jersey
My Commission Expires Mar. 31, 1975

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SIMON, DENSTMAN & NOONAN
11 COMMERCE STREET
NEWARK, N. J. 07102
(201) 642-2656
ATTORNEYS FOR Defendant

SUPERIOR COURT OF NEW JERSEY
CHANCERY DIVISION-HUDSON COUNTY
DOCKET NO. C C-2403-69

PASSAIC VALLEY SEWERAGE COMMISSIONERS, a public corporation,

Plaintiff,

v.

CRUCIBLE STEEL CORPORATION OF AMERICA, SPALDING WORKS, 1000 South Fourth Street, Harrison, New Jersey,

Defendant.

Civil Action

AFFIDAVIT

STATE OF NEW JERSEY :
: s s
COUNTY OF HUDSON :

HENRY F. O'SHAUGHNESSY, being duly sworn, according to law upop his oath deposes and says:

1. I am Vice President of the Spaulding operation of defendant, Crucible, Inc. I am the General Manager of the manufacturing plant operated by said defendant in Harrison, N. J. I have held the mentioned office and job assignment with defendant for approximately six months or more. The events involved in the

above captioned civil action occurred during this period. I have a B.S. degree in civil engineering and, prior to my employment with defendant, I had about 17 years of experiance in the metal fabricating industry, primarily in the management field.

2. Defendant owns about 14 acres of land in Harrison, New Jersey, on which it conducts a steel rolling mill. These 14 acres are part of a larger industrial complex containing about 60 acres on which many others operate various types of industrial, manufacturing and service activities. I am informed that at one time defendant owned the entire complex, and that, from time to time, it conveyed portions of the tract to others, until it was left with the mentioned 14 acres.

3. At its Harrison plant, defendant fabricates sheet and coil steel into various products which meet the particular specifications of defendant's customers. Its manufacturing activity is not conducted at or near the bank of the Passaic River. Separating the plant and the river is a roadway about 50 feet wide and an open area about 75 feet wide.

4. On January 16, 1970, plaintiff gave written notice to defendant that a "polluting material such as oil" was being discharged from a box culvert located at the bank of the Passaic River "in front" of defendant's Harrison plant.

5. This culvert is the terminal point of a large underground storm drain pipe or main. According to available maps, this main is 1275 feet long; it is 8 feet 6 inches in diameter in some places, and 8 feet 8 inches in diameter at other places. Only a relatively short portion of this main runs beneath defendant's 14 acre tract. Before this main reaches defendant's lands, it runs a considerable distance beneath lands in the

complex formerly owned by defendant but presently owned and used by others. After this main leaves defendant's property it runs beneath the above mentioned roadway and beneath the open area described above, a total distance of about 125 feet before it terminates at the river.

6. This main is part of a storm drainage system, which has been in existence for many years. It consists of about 16,588 feet of underground pipe. It is designed to collect surface water and to discharge it into the Passaic River. Other components in the system are manholes into which surface drainage runs, and laterals from the manholes which are connected to the main.

7. From the maps available it appears that there are 16 known laterals which run into this main. Four of these laterals run to the main from manholes on the 14 acre portion of the complex presently owned by defendant, and the other 12 run into the main from points outside the property owned by defendant and used by other occupants of the industrial complex.

8. After defendant received the notice from plaintiff dated January 16, 1970, I had a number of conversations with plaintiff's personnel. They described the "polluting material" referred to in their notice as a continuous flow of a fine oily substance that has the appearance of a fine number 2 type fuel oil, or a mineral oil, which had suspended in it a fine powdery or pulverized substance. Defendant has not been furnished with any specific or more accurate description of this substance. I was informed by plaintiff's chemist, Mr. Goldberg, that the samples taken by plaintiff at the outfall of the above mentioned main and submitted to him for analysis, did not contain sufficient quanti-

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ties of this substance to permit him to identify it.

9. I am reasonably certain that the substance which plaintiff claims is running into the river from this main, is not any industrial waste which is incidental to defendant's fabricating activity at the Harrison plant. That operation produces two kinds of industrial waste: spent acid, both nitric acid and sulfuric acid, neither of which answers to the description of the "polluting substance" which plaintiff contends is being discharged into the river. The other waste product is rolling solution which may have oily characteristics but it does not resemble either fuel oil or mineral oil. Depending upon the process employed, this rolling solution, after use, is either blue-green or pink in color. Defendant is not discharging either type of waste into the subject drainage system. The defendant does not use fuel oil in its plant; it employs gas as heating fuel.

10. I am informed that from time to time during the summer months, defendant, as a dust abatement measure, has spread spent rolling oil upon the ground in its plant area. However, I am also informed that this practice has not been engaged in since the summer of 1969, and it certainly was not done during my entire tenure with defendant. Therefore, this practice, certainly cannot account for the presence of an oily polluting substance at the outfall of the drainage main as late as January 1970. If it should become necessary to employ dust abatement measures in the future, defendant will take precautions not to spread any substance used for this purpose in the area of drains.

11. When defendant received the abovementioned notice from plaintiff in January 1970, I caused to be made a careful systematic review and examination of defendant's operation at its

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Harrison plant, with emphasis upon its method of handling possible contaminants. As a result of this examination and review the following was discovered and the indicated measures were taken:

(a) It was discovered that some of defendant's employees had been steam cleaning mobile equipment in the vicinity of some manholes. While it was not known that these manholes are connected by means of laterals to the subject drainage main, there being other drainage systems in the complex, this practice was discontinued to prevent any possibility that oil, removed from the equipment during the cleaning process, would be washed down the manholes and ultimately into this main.

(b) I directed that tighter control be exercised over spent acid discharge, notwithstanding that the claimed pollutant is not described as an acid.

(c) It was discovered that some of defendant's employees were dumping waste oil into a pit which had previously contained a fuel storage tank and this pit was near a surface drain. Although it was not known that this drain connects to the mentioned drainage main, this oil dumping practice was stopped.

(d) It was found that a pump employed in a hood annealing operation was discharging oil into a pit. This discharge was sealed off and the oil is now being collected in metal drums.

12. The following other occupants of the complex use the subject drainage main through one or more laterals which connect to the main from the portions of the complex which they occupy:

(a) Charles F. Guyon, Inc., which has 5 laterals that run into the main.

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(b) Miele Bros. Trucking Co., which uses 2 laterals.

(c) Azco Steel Company, which has 1 lateral.

(d) Gabest, Inc., which has 1 lateral.

(e) Prince Packaging Products, Inc., which also has 1 lateral.

(f) Joseph Supor Trucking Co., which has 2 laterals.

13. It may well be that in addition to the 4 connecting laterals on defendant's lands and the 12 laterals mentioned in the preceding paragraph, there are additional laterals which other occupants of the complex have constructed and connected to the subject drainage main. However, the 16 laterals specifically mentioned herein are the only ones shown on the maps available to this defendant and the only ones known to the defendant.

14. In addition to the specific measures mentioned in Paragraph 11, and since suit was instituted, Mr. Arthur Whinn, the Maintenance Superintendent of defendant's Harrison plant, installed filters in all of the known laterals that run into the drainage main. This was done in an effort to locate the source of any contaminants that might have been reaching the main. Thereafter, and recently, defendant discovered a slight trace of an oily substance on one of the filters. This substance was traced back to a basement machine shop on defendant's premises, where defendant found that oil was dripping from a grinding machine and was entering a drain apparently connected to the mentioned lateral. Up to this time, defendant had believed that this drain ran into a dry well storage area. Defendant is presently at work diverting this oil dripping away from this drain and expects to have this condition corrected in about a week or less.

15. In addition, on May 11, 1970, I met with re-

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presentatives of some of the other occupants of the complex who make use of this drainage system. At the time I explained the problem and received assurances from them that they will cooperate in preventing pollutants from entering the drainage system from the premises they occupy. I have received like assurances from all but one of those other occupants who were not able to send representatives to the meeting. The exception was Prince Packaging Products, Inc. I was not able to contact this company and I am not certain that it is any longer actively engaged in business within the complex.

16. I earnestly request that the court refrain from entering a pendente lite injunction against the defendant. On the basis of the knowledge presently available to it, defendant has taken all steps within its power to bring about an end to the condition about which plaintiff complains. If that condition continues despite defendant's efforts, it is because defendant, at present, does not know what is causing the condition. Detection of the cause is extremely difficult because up to the present time plaintiff has not collected a sufficient amount of the contaminant entering the river to permit its identification. If a pendente lite injunction were entered, defendant, at present, would not know what more it could do to comply with it. Defendant requires additional time to continue its investigation to locate the cause of the substance which plaintiff finds offensive, assuming that it has not already been found and corrected, or is not already in process of correction. It is proper in this connection to observe that no serious harm or injury will be sustained if injunctive relief is withheld at the present time. From what has been stated above, only minute quantities of the polluting

substance are being discharged into the river from the drainage main.

17. It has occurred to defendant that the claimed condition may be halted if the subject drainage system is closed. However, I am informed that defendant has no legal right to take such action because when defendant, from time to time, conveyed portions of its lands to others in the complex, it conferred upon them, by way of easements, the right to use this system for drainage purposes. Equally important, if storm and surface waters were not permitted to escape through this system, there would be danger of flooding not only on defendant's premises, but in other areas of the complex served by the system. It is to be expected that resulting flood waters would contain considerable contaminants, would run off into the river and would create a danger of a much greater degree of pollution than the small amount presently claimed by plaintiff.

18. Defendant assures the Court that the present withholding of injunctive relief will not result in any relaxation of its efforts to continue its monitoring of the system and its efforts to locate and control or correct the source of the claimed pollution, assuming that correction has not already been effected or is not in process.

SUBSCRIBED AND SWORNTTO :
BEFORE ME THIS 5th DAY :
OF June 1970 :

HENRY F. O'SHAUGHNESSY

T. E. SULLIVAN :

Notary Public of New Jersey.

T. E. SULLIVAN
NOTARY PUBLIC OF NEW JERSEY
My Commission Expires March 12, 1973

5/7 8, 1970

SIMON, DENSTMAN & NOONAN
11 COMMERCE STREET
NEWARK, N. J. 07102
(201) 642-2696
ATTORNEYS FOR Defendant and Third Party Plaintiff

SUPERIOR COURT OF NEW JERSEY
CHANCERY DIVISION-HUDSON COUNTY
DOCKET NO.

PASSAIC VALLEY SEWERAGE COMMISSIONERS, a public corporation, Plaintiff, v. CRUCIBLE, INC., a New Jersey corporation, (originally designated in the complaint herein as "Crucible Steel Corporation of America, Spalding Works"), Defendant and Third Party Plaintiff, v. CHARLES F. GUYON, INC., MIELE BROS. TRUCKING CO., AZCO STEEL COMPANY, GABEST, INC., PRINCE PACKAGING PRODUCTS, INC., JOSEPH DUPOR TRUCKING CO., HARRIS and SONS STEEL COMPANY, HARRISON WAREHOUSE COMPANY, ROSE RIBBON and CARBON MANUFACTURING CO. INC., ADMIRAL STEEL EQUIPMENT CO. INC., SUPER STEEL INDUSTRIES, INC., corporations, and MILES A. GALIN, Third Party Defendants.	Civil Action THIRD PARTY COMPLAINT

Third Party Plaintiff, Crucible, Inc., a New Jersey corporation, whose Post Office address is 1000 So. 4th Street,

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876970049

Harrison, County of Hudson and State of New Jersey, complaining against the Third Party Defendants, says that:

1. Third Party Plaintiff operates a steel manufacturing plant upon lands owned by it in a portion of a large industrial complex in Harrison, Hudson County, New Jersey. Said complex, which contains in excess of 60 acres of land, is commonly known and designated as 1000 So. 4th Street, Harrison, New Jersey.

2. Heretofore, Third Party Plaintiff was the owner of said entire industrial complex. From time to time in the past, it conveyed to others portions of the lands and buildings comprising said complex until Third Party Plaintiff was left with and now retains 14 acres of land in said complex. The Third Party Defendants occupy various portions of the complex thus conveyed by Third Party Plaintiff, as the grantees of Third Party Plaintiff, or as the successors in interest of said grantees, or as the tenant of said grantees or their successors in interest. The Third Party Defendants conduct in and upon said lands thus conveyed various types of manufacturing, industrial and service industries.

3. At present there is, and at all times in the past material hereto, there has been an underground storm drainage system which lies beneath the lands retained and presently owned by Third Party Plaintiff, and the lands conveyed by Third Party Plaintiff to others, which latter lands are presently owned and/or occupied by the Third Party Defendants. Said storm drainage system consists of a long pipe which serves as a central drainage main and which empties into the Passaic River; numerous manholes located on the premises of Third Party Plaintiff, and on the premises of the Third Party Defendants, which collect surface water; and a number of underground lateral pipes which run beneath the lands of Third Party Plaintiff and the premises of the Third Party

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Defendants, and which convey water collected in said manholes into said central drainage main and ultimately into the Passaic River.

4. Third Party Plaintiff has knowledge of 16 such lateral pipes. Four of said laterals run beneath Third Party Plaintiff's lands. Twelve of said laterals run beneath the lands owned or occupied by the Third Party Defendants. There may be additional laterals which run beneath the lands owned or occupied by the Third Party Defendants, but Third Party Plaintiff has no present knowledge of their existence or location.

5. Plaintiff, Passaic Valley Sewerage Commissioners, has filed a complaint against the Third Party Plaintiff in this action which alleges that Third Party Plaintiff has allowed and has continued to allow a polluting substance to enter the Passaic River through said drainage main. In said complaint, plaintiff, Passaic Valley Sewerage Commissioners, seeks a final judgment, which, if granted, would enjoin Third Party Plaintiff from allowing any substance prohibited by N.J.S.A. 58:14-7 and N.J.S.A. 58:14-8 to enter said river through said central drainage main. A copy of said complaint is annexed hereto, however, without intention on the part of Third Party Plaintiff to adopt as true the allegations thereof.

6. Third Party Plaintiff has made efforts to prevent the emission of any polluting substance into the Passaic River through said central drainage main. As a result of such efforts, Third Party Plaintiff believes that it is not responsible for such emission which plaintiff, Passaic Valley Sewerage Commissioners, alleges still continues. Third Party Plaintiff further believes that any alleged polluting substance claimed by plaintiff,

Passaic Valley Sewerage Commissionmrs, to be entering the Passaic River, from the river outfall of said central drainage main, may be entering said drainage system at a place or places on lands owned or occupied by one or more of the Third Party Defendants.

7. In addition to a final judgment containing an injunction as hereinabove described, plaintiff, Passaic Valley Sewerage Commissioners, has made application to the Court in this action, for an injunction preventing the discharge of polluting materials into the Passaic River pending entry of final judgment in this action. Any injunction granted in this action, whether final or pendente lite, will, or may limit, curtail, prevent or otherwise affect the use of said entire storm drainage system.

8. The Third Party Defendants have or may have legal rights in said storm drainage system, and in the use thereof, which rights have or may have been derived from certain easements created in various deeds of conveyance, wherein and whereby Third Party Plaintiff conveyed to others portions of the herein described industrial complex, or which were created in various agreements to which said Third Party Plaintiff was a party. Such rights, if any, are subordinate to the right of the public that no polluting substance should be discharged from said storm drainage system into the Passaic River.

9. Any Order or Judgment made in this civil action, pertaining to said central drainage system, will or may affect the aforementioned rights, if any, of the Third Party Defendants. Therefore, the Third Party Defendants, are necessary and indispensable parties to this action.

WHEREFORE, Third Party Plaintiff demands judgment against the Third Party Defendants:

A. Adjudging and declaring the rights, if any, of Third Party Defendants in and to said central drainage system.

B. Adjudging and declaring that the rights of Third Party Plaintiff and the rights, if any, of the Third Party defendants in and to said central drainage system, and to the use thereof, are subordinate to the right of plaintiff, Passaic Valley Sewerage Commissions, and of the public, that no polluting substance should be discharged into the Passaic River through said storm drainage system.

C. Adjudging and declaring that any Order or Judgment entered in this civil action and made in the public interest, which may curtail, limit, restrict, prevent or otherwise affect the use of said storm drainage system, shall be binding upon the Third Party Defendants and shall not give rise to any cause of action or claim in favor of the Third Party Defendants against the Third Party Plaintiff, for damages, compensation, or other relief of any kind whatsoever in law or in equity.

D. Enjoining and restraining any Third Party Defendant or defendants who may be causing or allowing any polluting substance to enter said drainage system from so doing.

E. If it shall be ordered or adjudged herein that said drainage system must be closed, enjoining and restraining all of the Third Party Defendants from causing or allowing any substance of any kind whatsoever to enter said drainage system.

F. For costs of suit.

SIMON, DENSTMAN & NOONAN,
Attorneys for Defendant and
Third Party Plaintiff,

by /s/ Sam Denstman
SAM DENSTMAN,
A Member of the Firm.

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STATE OF NEW JERSEY :
: s s
COUNTY OF E S S E X :

SYLVIA SAROS, of full age, being duly sworn according to law, on her oath deposes and says:

1. I am a secretary in the law offices of Simon, Denstman and Noonan, 11 Commerce Street, Newark, New Jersey.

2. On July 8, 1970, I mailed a copy of the within Notice of Motion upon Thomas E. Durkin, Jr. Esq., attorney for plaintiff, by enclosing said copy in an envelope addressed to said attorney at his office, 24 Branford Place, Newark, New Jersey, and by depositing said envelope, with postage thereon prepaid, in the United States mail at 11 Commerce Street, Newark, New Jersey.

SUBSCRIBED AND SWORN TO :
BEFORE ME THIS 8th DAY :
OF JULY, 1970. :

Sylvia Saros
SYLVIA SAROS

Joan E. Molnar
JOAN E. MOLNAR
Notary Public of New Jersey
My Comm. Expires Mar. 31, 1975.

We hereby certify that a clear carbon copy of the within Notice of Motion has been filed with the Chancery Division of the Superior Court in Hudson County.

SIMON, DENSTMAN & NOONAN,
Attorneys for Defendant,
Crucible, Inc.,

by Sam Denstman
SAM DENSTMAN,
A Member of the Firm.

Jan 21, 1971

SIMON, DENSTMAN & NOONAN
11 COMMERCE STREET
NEWARK, N. J. 07102
(201) 642-2656
ATTORNEYS FOR CRUCIBLE, INC.

SUPERIOR COURT OF NEW JERSEY
CHANCERY DIVISION-HUDSON COUNTY
DOCKET NO.

PASSAIC VALLEY SEWERAGE COMMISSIONERS, a public corporation, Plaintiff, v. CRUCIBLE, INC., a New Jersey corporation, Defendant and Third Party Plaintiff, v. CHARLES F. GUYON, INC., et al, Third Party Defendants.	Civil Action AFFIDAVIT

STATE OF NEW JERSEY :
: s s
COUNTY OF HUDSON :

ARTHUR WHINN, being duly sworn according to law, upon his oath deposes and says:

1. I am employed at present by the defendant, Crucible, Inc., as its maintenance superintendent. I have held this position with Crucible, Inc., for approximately 3 years and for about 27 years prior to my present job assignment I have held various supervisory positions with my employer. The work done by my employer to locate and abate the pollution which is

involved in this case, has been largely done under my personal supervision. In this connection I have worked closely with Mr. William Bradley.

CORRECTIVE WORK ON CRUCIBLE'S PREMISES

2. The pollution about which plaitiff complains is a flow of fine oil which enters the Passaic River from the outfall of a large underground drainage system in an industrial complex in Harrison, New Jersey, a part of which is owned and occupied by my employer. There have also been occasional emissions of acid into the river from this drainage system.

3. To abate the acid problem Crucible, Inc., on about December 10, 1970, completed the installation of an acid holding reservoir and presently it discharges spent acid from its plant operations into this reservoir. There, spent acid is neutralized by mixing it with large quantities of water from plant operations. I am informed that since the installation of this reservoir PH readings of samples of the effluent taken at the river outfall of the drainage system have been satisfactory.

4. Commencing in about January 1970, the following measures were taken by Crucible, Inc., to abate the flow of oil to the river from Crucible's premises:

(a) The prohibition of steam cleaning of equipment in the neighborhood of manholes that might connect to the drainage system.

(b) The cessation of dumping of waste oil into a pit near a surface drain.

(c) The sealing off of an oil discharge from a pump employed in Crucible's hood annealing operation.

(d) The re-routing of a drain line from a

roll-grinding operation away from a surface drain and into a holding reservoir.

5. As a result of these measures, which were completed by about the summer of 1970, I believe that no oil enters the river through the drainage system from Crubile's premises.

THE GUYON LATERAL NO. 1

6. Although Crucible eliminated the emission of oil from its own premises, thereafter samples of effluent taken at the river outfall continued to contain, at times, visible quantities of oil. As a result Mr. Bradley conducted an investigation in which I participated, in areas of the subject industrial complex, occupied by the Third Party Defendants. This investigation revealed that oil was entering the central main of the drainage system through a lateral pipe which has been identified as Guyon Lateral No. 1 in earlier proceedings had in this action. This lateral, as it is shown on a survey previously exhibited to the Court, joins the central drainage main about 150 feet west of the easterly boundary line of the industrial complex and extends underground in a generally southerly direction beneath the property of the Third Party Defendant, Charles F. Guyon, Inc. Other underground pipes running beneath the lands of Guyon and other Third Party Defendants, tie in to this lateral. So far as we have been able to determine these other Third Party Defendants are Harris & Sons Steel Company, Harrison Warehouse Company and Rose Ribbon and Carbon Manufacturing Co. Inc.

7. We have in the past found oil at different points in these connecting pipes and fairly consistently at the place where the Guyon No. 1 lateral joins the central drainage main. Extensive efforts, detailed in Mr. Bradley's af-

fidavit, were made by Crucible to discover the source of this oil. If the source could be found it was thought that the oil condition could have been eliminated at its source. However, the investigation detailed in Mr. Bradley's affidavit did not reveal the source.

8. After corrective measures as described in Paragraph 4 above were taken by Crucible, the sole remaining cause of oil pollution from within the industrial complex, to the best of my knowledge, is the oil which has been seen in the Guyon No. 1 lateral, and its connecting pipes. Because Crucible had not succeeded in locating the source of this oil, the only other means of abating it was to plug the Guyon No. 1 lateral at the place where it joins the central drainage main.

9. After a number of prior efforts to do so, Crucible installed a temporary plug in the Guyon No. 1 lateral on about November 30, 1970. This temporary plug consisted essentially of a hard rubber baloon inflated to about a 20 inch diameter to which there is connected a 100 foot tube with a stem valve at its end to permit the air in the baloon to be removed. A temporary rather than a permanent plug was used because Crucible desired to determine whether closing the Guyon No. 1 lateral would cause any back-up of water or flooding in the complex.

10. This plug remained in place until January 7, 1971. While it was in place I saw no flooding in the complex, and received no reports of flooding from anyone there, notwithstanding that during the first week in January 1971, there was, on several occasions, heavy precipitation in the area in the form of rain and snow.

11. While the temporary plug was in place, samples of effluent taken at the river outfall of the drainage

system, which samples I have seen, were clear of visible oil and I believe that Mr. Bradley's analyses of these samples indicate the same finding. Thus, the temporary closing of Guyon No. 1 lateral, in connection with other corrective measures completed by Crucible, resulted in an acceptable effluent.

12. However, the temporary closing of this lateral is not the long term answer to the oil problem. Temporary plugs are relatively fragile and eventually break down. On January 7, 1971, I was present when a representative of the plaintiff Commissioners took a sample of the effluent. It appeared oily. Thereafter, and on the same day, I examined the Guyon No. 1 lateral and observed that the temporary plug placed there on November 24, 1970, had loosened and that water was being discharged into the central drainage main from this lateral. It was too dark inside the drainage main, the place where I made my examination, to determine whether this water was oily, but the water which was discharging into the river at this time, was oily.

13. What is required is the permanent closure of the Guyon No. 1 lateral with a plug made of durable materials that will not loosen or disintegrate. Such a permanent plug would not have a release device upon it, as the air release device that was part of the temporary plug. This solution falls short of discovering what causes oil to enter the Guyon No. 1 lateral and the elimination of that cause. Crucible has expended considerable time, effort and money attempting, without success, to discover the cause. It can do nothing more except to install a permanent plug and it should be authorized to do so. If any other occupants of the complex object to this course of action, the Court ought to direct them, and especially the Third Party

Defendants, Guyon, Harris, Harrison Warehouse and Rose Ribbon and Carbon Manufacturing Company to locate and abate the cause themselves within a limited time. Upon their failure to do so, the Court should order permanent closure of the lateral. Crucible was able to eliminate the emission of oil attributable to its own operations because it has an intimate knowledge of those operations and it took the pains to effect correction. It does not have a like intimate knowledge of the operations of other occupants of the complex which would permit it to go further. I suggest to the Court that it is unfair to further tax the energies, resources and personnel of Crucible with the location of the cause and clean-up of oil pollution that has its origin on the property of others.

CLEAN-UP OF RIVER BANK

14. Plaintiff contends that oil has accumulated from the bank of the river at and near the outfall of the central drainage main and that this condition could be corrected. Representatives of Crucible and plaintiff have previously discussed methods of treating this situation and it was suggested that the bank of the river in the mentioned area should be covered in some manner with stones, sand, earth fill, or the like. Crucible undertook to investigate the feasibility and cost of work of this kind and is agreeable to going forward with it provided that other Third Party Defendants, including the Town of Harrison, who make use of the central drainage system, should share the cost.

15. Crucible received oral estimates from 3 contractors for the described work. None of these contractors would present flat figure estimates. All of them insisted upon

quoting estimates on an exclusive time and material basis. On the basis of one such estimate presented by one of these contractors, Spinella, I estimate that the total cost for the work proposed by Spinella would have been approximately $44,000. I was not able to judge the approximate cost of the work on the basis of the proposals made by the remaining 2 contractors.

16. Crucible has also discussed with a fourth contractor, Joseph Nesto & Sons, two different alternative methods of treating the condition of the bank of the river. It believes that either of these methods would be feasible. Nesto suggested lining the bank with bags containing mixtures of sand and cement. This mixture would solidify when wet, and after solidification, a like covering of sand fill could be placed on the banks. Alternatively, Nesto proposed lining the bank with large stones and filling in this lining with sand and gravel. Either of these methods, according to Nesto, would cost approximately $20,000. A written estimate has been requested of Nesto several times but at present it has not been received. Nesto did not estimate the time necessary to complete a project of this kind and as best as I can judge, it would take 3 or more weeks, tide and weather permitting. It would not be feasible to commence this work until oil pollution from within the complex is permanently abated. There is no sense in lining the bank of the river, if, thereafter, oil would come out of the drainage system and would be deposited on the new covering materials. This means that a permanent correction of the condition found at the Guyon No. 1 lateral should be accomplished before work on the bank of the river is undertaken.

17. The bank of the river and the land

immediately adjacent to it, are owned by the Third Party Defendant, Public Service Electric & Gas Company. Before work on the river bank can go forward, it will be necessary for Public Service Electric & Gas Company to consent to such work and also to consent to entry upon its lands to perform that work. The consent will have to cover the bringing of heavy equipment, materials and personnel upon the property of this Third Party Defendant. If such consent is not forthcoming, the work on the bank of the river cannot go forward.

COSTS

18. In addition to the approximate $20,000 verbal estimate quoted by the Nesto Company, Crucible has expended for labor costs for work performed by its own personnel, in connection with the subject pollution problem, as of December 28, 1970, $4,251. This expense covers a total of 576 man hours devoted by Crucible personnel, including supervisory labor, to the project. 401 1/2 man hours were devoted by Crucible to work performed on its own premises and 174 1/2 man hours were devoted to work performed on the premises of other complex occupants. Of the $4,251 in labor costs, Crucible has allocated $2,905.50 for work performed on its own premises, and $1,345.50 to work performed on the premises of other complex occupants. Annexed hereto, made a part hereof and marked Schedule A is a detailed breakdown of the aforementioned labor charges. In addition, Crucible, during 1970, has paid or owes Mr. Bradley for his services, a total of $3,138. Annexed hereto, made a part hereof and marked Schedule B is a breakdown of Mr. Bradley's charges.

19. Crucible requests that the Court should require the other complex occupants to reimburse it for said $1,345.50 labor charge, and for a pro-rata share of the $3,138 paid or owed to Mr. Bradley. In addition, Crucible requests

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that the Court should order the other complex occupants to contribute to the cost of the bank clean-up in such amounts as the Court finds equitable and just.

SUBSCRIBED AND SWORN TO :
BEFORE ME THIS 25th DAY :
OF January 1971 :

Arthur J. Whinn
ARTHUR WHINN

T. E. Sullivan :

Notary Public of New Jersey.

T. E. SULLIVAN
NOTARY PUBLIC OF NEW JERSEY
My Commission Expires March 12, 1973

April 27, 1971

SUPERIOR COURT OF NEW JERSEY
CHANCERY DIVISION-HUDSON COUNTY
DOCKET NO.

PASSAIC VALLEY SEWERAGE COMMISSIONERS, a public corporation,

Plaintiff,

v.

CRUCIBLE, INC., a New Jersey corporation,

Defendant and Third Party Plaintiff,

v.

CHARLES F. GUYON, INC., et al,

Third Party Defendants.

Civil Action

AFFIDAVIT

STATE OF NEW JERSEY :
: s s
COUNTY OF BERGEN :

WILLIAM R. BRADLEY, being duly sworn according to law, upon his oath deposes and says:

1. I am an environmental health consultant. My professional qualifications were set forth in testimony given by me in a Court hearing heretofore had in this case. At the request of Crucible, Inc., I have, since about June 1970, been engaged in efforts to locate the source of and to abate the pollution which is the subject matter of this action.

2. Among other things, my work involved the examination and analysis of samples of the effluent taken from the subject drainage system at the place where it empties into the Passaic River, and at different points in that system within the subject industrial complex.

3. Samples were taken at points in the drainage system within Crucible's premises and oil was found in two of these samples taken on July 15 and August 7, 1970. This indicated that probably oil from within Crucible's plant was entering the drainage system. Steps were taken by Crucible to eliminate this oil and after August 7, 1970, no oil was found in the water samples taken from the system at points within Crucible's property. To the best of my knowledge, no oil presently enters the drainage system, as a result of any operations conducted by Crucible on its own property.

4. Occasionally, samples were taken at the river outfall of the system, had a PH analysis on the acid side. This condition was traced to Crucible's operations and steps, described in Mr. Whinn's affidavit, were taken to correct this situation. The work of correction was completed in early December 1970, and since then, the PH analysis of samples has been good.

5. One of the points checked in the system was the place where the Guyon No. 1 lateral joins the main drainage line. Oil was seen in water samples taken at this point on July 1 and 17, and August 12 and 21, 1970. Only 2 samples taken at this point during this period, on July 15 and July 27, 1970, did not, on examination, contain oil. In addition, a fiberglass filter was kept in the Guyon No. 1 lateral between September 11 and 15, 1970. This filter collected an extremely heavy concentration of oil. Thereafter, an inspection made on October 16, 1970, at various points in the Guyon No. 1 lateral, and in other pipes connected to it, revealed the presence of oil and oil sludge in the lateral and in these pipes. On November 9, 1970, another filter was placed in this lateral and again oil was collected upon

9. Given the steps taken by Crucible to prevent entry of oil into the drainage system from its own premises; given the frequent presence of oil in the Guyon No. 1 lateral; given the absence of oil in river outfall samples while a temporary plug in the Guyon No. 1 lateral was operative; given the reappearance of oil at the outfall subsequent to the displacement of the temporary plug in the Guyon No. 1 lateral, as described in Mr. Whinn's affidavit, it is my opinion that at present, the oil from this lateral is the only oil that enters the river from within the complex.

10. Because it has not been possible to determine how oil enters the Guyon No. 1 lateral, I recommend that this lateral be closed permanently. Experience with the temporary plug suggests that closure will not cause flooding. Based upon all of the information available to me, I believe that if this lateral is closed, no more oil will enter the river from the complex and through the drainage system. I believe that thereafter the only oil that will be encountered will be oil in the Passaic River itself that is washed in and out of the mouth of the drainage main by the action of the tides. In this last connection I note that on August 12, 1970, we found oil present in the river itself upstream from the outfall of the system.

11. I urge the Court to direct the permanent closing of the Guyon No. 1 lateral.

SUBSCRIBED AND SWORN TO :
BEFORE ME THIS 26th DAY :
OF January 1971 :

William R. Bradley
WILLIAM R. BRADLEY

Joan E. Molnar :

A Notary Public of N. J.

876970066

SIMON, DENSTMAN & NOONAN
11 COMMERCE STREET
NEWARK, N. J. 07102
(201) 642-2656
ATTORNEYS FOR CRUCIBLE, INC.

SUPERIOR COURT OF NEW JERSEY
CHANCERY DIVISION-HUDSON COUNTY
DOCKET NO. C-2403-69

PASSAIC VALLEY SEWERAGE COMMISSIONERS, a public corporation,	:	
Plaintiff,	:	Civil Action
vs.	:	AFFIDAVIT
CRUCIBLE, INC.,	:	
Defendant and Third Party Plaintiff,	:	
vs.	:	
CHARLES F. GUYON, INC., et als,	:	
Third Party Defendants.	:	

STATE OF NEW JERSEY :
: ss.:
COUNTY OF ESSEX :

WILLIAM R. BRADLEY, of full age, being duly sworn according to law upon his oath deposes and says:

1. I make this affidavit for use by the Court on the May 14, 1971 continued hearing date in the above-entitled civil action, and in supplementation of my testimony and my affidavit of January 26, 1971, previously given and filed herein. I regret

that I will not be able to personally appear in court on May 14, 1971. Except for May 23, 24 and 25, 1971, I expect to be out of the country throughout May, 1971.

OIL

2. Pursuant to an order made herein by the Court on March 2, 1971, the Guyon No. 1 lateral was permanently closed on March 11, 1971. This lateral had been previously identified, in my January 26, 1971 affidavit, as the then sole source of oil entering the subject central drainage main from the industrial complex which the main serves.

3. In my opinion, the closure of the Guyon No. 1 lateral has resulted in the abatement of oil pollution from inside the complex. Since that lateral was plugged, no visible oil was seen entering the central main from any other lateral. While some oil, probably residual oil, was visible at the river outfall of the main for a short time after the plug was inserted, none has been observed there recently.

4. On April 19 and 20, 1971, silt was observed entering the river from the outfall of the drainage main. I believe that this is a favorable sign as far as abatement of oil pollution is concerned.

5. Where an underground drainage system collects surface water, as does the system involved in this case, it will usually collect silt, as well, from the surface of the ground drained by the system. In the subject system, a probable secondary source of silt accumulation, is silt carried in the river and deposited in the central main of the system by the ebb and flow of the tide. Normally, this silt, which is not a polluting substance, gradually will be washed out of the drainage system

and into the river by the water that passes through the system. This has not happened in the past, so far as the subject system is concerned, because the silt that has accumulated there was apparently mixed with oil that bound it to the interior of the central main. The recently observed movement of the silt indicates not only that oil is not entering the central main, but also, that silt which has accumulated in the main has been or is in the process of being washed clean of oil. Before this movement of silt was observed, it was anticipated that accumulated silt in the drainage main, because it was infiltrated with oil, would have to be removed at some very considerable expense. However, recent movement of the silt indicates that this costly cleaning process may not be necessary. I recommend that the condition of the silt in the central main be kept under observation and that for the time being a judgment as to the necessity for cleaning of the main be withheld.

6. The closure of the Guyon No. 1 lateral has had another beneficial effect. The oil residue on the bank of the river in the vicinity of the outfall of the central main has diminished tremendously. In places on the bank where earth and stones were black with oil, I have observed brown mud and clean stones. This has resulted because no additional oil has been deposited on the bank and the action of the tides is cleaning away the oil that was there from before. I believe that the oil residue on the bank will wash away with the action of the tides. However, it may be necessary to add a coating of sand to the bank if the tides do not accomplish an appropriate clean-up of the bank within a reasonable time. I recommend that the bank condition be kept under future observation and that a judgment as

to the necessity for additional clean-up work there be withheld for the present.

ACID

7. Intermittently, samples of effluent taken from the river outfall of the system, had been on the acid side (below the 5-6 PH range). Crucible sought to correct this condition by installing two baffles in the drainage main, which had the effect of creating two holding reservoirs, in which it was hoped that acid would be diluted with water, to the end that acceptable PH readings would be obtained. This was done in the early part of December, 1970.

8. Thereafter, water samples taken at the outfall had the following PH analyses:

DATE	PH
December 16, 1970	6.2
28	6.2
January 6, 1971	6.2
7	6.5
12	6.5
20	3.6
21	6.3
February 4, 1971	5.1
9	3.6
March 22, 1971	6.0
23	4.8
April 5, 1971	3.2
7	6.6

9. As appears from the foregoing analyses, the baffle system generally worked reasonably well for more than a month after it was installed, but that more recently PH analyses have fluctuated.

10. Consequently and because plaintiff has expressed dissatisfaction, I recommended an entirely new acid neutralization system for Crucible, that will involve "in plant" treatment of acid waste and ultimate discharge of treated effluent, not into the river by way of the subject drainage system, but into plaintiff's sanitary sewer line. This system is described, and a time table for its installation, is included in my letter of April 13, 1971 to Mr. S. A. Lubetkin, plaintiff's chief engineer. A copy of my letter is annexed hereto. Mr. Lubetkin has accepted this proposed acid treatment system.

11. As of April 20, 1971, the following has been done to further the installation of the new system:

(a) The design work for the system is practically complete.

(b) The pre-treatment tank is on hand, ready for installation.

(c) The final neutralization tank is on hand. This tank is approximately forty feet long and eight feet in diameter. Among other things it will have to be moved by crane to the place of installation, and installed in the ground, in an excavation to be made for that purpose. Bids for this work have been requested.

(d) The stainless steel pump and stainless steel piping are on order and Crucible expects to receive them soon.

(e) Acquisition of PH monitoring equipment is in process.

William R Bradley
WILLIAM R. BRADLEY

Sworn and Subscribed to
before me this 27th day
of April, 1971.

Joan E. Molnar
A NOTARY PUBLIC OF NEW JERSEY.
JOAN E. MOLNAR

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876970071

Colt Industries

Crucible Inc.
Spaulding Operation

1000 South Fourth St.
Harrison, NJ 07029
201/485-5700

April 13, 1971

Mr. S. A. Lubetkin, Chief Engineer
Passaic Valley Sewerage Commissioners
790 Broad Street
Newark, New Jersey 07102

Dear Mr. Lubetkin:

Water Pollution Control Program
Crucible - Harrison, New Jersey

As you know, we have been continuing our studies in an effort to locate and eliminate acid effluent from production operations into the Passaic River. This status report is to say that we have located what we believe to be all acid sources and have developed a program for elimination of acid wastes into the river.

For some time our program of dilution of infrequent rinse water volumes that were acid in nature did not prove successful to the point that we felt it "fool proof." For example, not always were we able to control production operations on odd shifts; dumping or sludging of the effluent, if you will, did not occur. These occasions were when line employees by-passed our dilution system and would discharge twenty-five or more gallons of fifteen percent acid directly into effluent channels.

Now we have redesigned the effluent system from the operations using a weak acid bath for a part of metal tempering to the point that we will have pre-neutralization, pH monitoring, pumping to final neutralization, and through again pH monitoring before discharge into the sanitary sewer system at a point 5pH or better. This program involves the following that is now reported to you:

1. Pre-treatment Tank

   This 335-gallon open pre-treatment tank is now on hand and is to be installed shortly. It will receive rinse water effluent that is on the acid side as the central receiver, and this tank will be used for pre-treatment with sodium hydroxide solution adjusted by pH monitoring.

2. A 50-gallon stainless steel pump with motor, together with necessary stainless steel piping, has been ordered and delivery is expected within fifteen days, in order to accommodate the pre-neutralization facility.

3. Running a pre-treatment acid effluent line across production areas, involving some floor escavation, into a large capacity final neutralization tank.

4. Installation of a final neutralization tank, of the capacity of a railroad oil tank car, into an escavated area at the side of the main operating building, to be equipped with floor control baffle and for use with limestone.

5. Final monitoring of pH station installation and connection to sanitary sewerage line.

The above captioned program we hope will have your approval, and the timing of this program as expeditiously as can now be set down is as follows:

A.	Delivery of the acid pump and piping	15 Days
B.	Installation of pre-treatment tank and sodium hydroxide system	30 Days
C.	Receipt of pH monitoring equipment	30 Days
D.	Escavation for large limestone treatment tank	45 Days
E.	Installation and preparation of tank, as it has now been received and is on hand	60 Days
F.	Connection of sanitary sewerage line with final treatment	Complete shortly after July 15, 1971.

This program has been reviewed by Crucible management and is submitted for your consideration.

Respectfully submitted,

Wm. R. Bradley (WRB)
Wm. R. Bradley
William R. Bradley and Associates
Tenafly, New Jersey

WRB/erl

cc: Mr. S. Denstman
Mr. J. Devaney
Mr. H. F. O'Shaughnessy
Mr. R. M. Lamborn
Mr. A. Whinn

C

876970075

COLTEC INDUSTRIES, INC.

TAB C

1971 Annual Report by the chief engineer to the Passaic Valley Sewerage Commission describing violations with back-up documentation attached.

ANNUAL REPORT

by

Chief Engineer
S. A. LUBETKIN

to the

PASSAIC VALLEY SEWERAGE COMMISSIONERS

FOR THE YEAR

1971

Violation & Elimination - Crucible Steel Co., Spaulding Works, 1000 South Fourth Street, Harrison, N.J.
December, 1969 to September 1971 (L. Cuccinello, W. Fleming and J. Colello)

A yellowish oily material flowed into the Passaic River from a large culvert owned by this company. This company claimed that a number of other companies leased land on an industrial tract owned by Crucible Steel Company, and the polluting material was not emanating from Crucible Steel itself, but from one of the other tenants, and therefore, the Crucible Steel Company would not be liable.

The Commissioners maintained that since the culvert from which this material discharged into the Passaic River was owned by Crucible Steel Company, Crucible Steel Company was liable for any polluting material emanating from the culvert. Since there seemed to be a difference of opinion concerning liability, the Commissioners instituted a suit against Crucible Steel Company. An Order to Show Cause was originally returnable on May 15, 1970, but was postponed to July 17, 1970, and continued to September 18, 1970.

On September 18, 1970, Crucible reported they had eliminated all of the pollution emanating within their property and had traced oil to other users of the sewer. They requested additional time to check suspected oil sources on the Charles F. Guyon and the Harris and Sons Steel Companies, and perhaps other parties.

Judge Lynch signed a Civil Action Order, bringing in Charles F. Guyon, Inc., Miele Brothers Trucking Company, Aszo Steel Company, Gabest, Inc., Prince Packaging Products, Inc., Joseph Supor Trucking Company, Rose Ribbon and Carbon Mfg. Co., Inc. (corporations), and Miles A. Galin.

On October 23, 1970, progress reports were submitted and the Commissioners stated that the volume of the pollution had decreased. Crucible was ordered to submit a detailed plan for locating and halting the remaining pollution to Mr. Lubetkin and they were to return to court and report on November 20, 1970. Since work was progressing, the November 20 hearing was postponed to December 4, then to February 11, 1971.

On February 11, Crucible reported to the court that it had located the source of pollution, but since it was from a line coming from other property, Crucible wanted permission of the Court to seal the line. The Court directed the line to be sealed within 30 days,

violation & Elimination - Crucible Steel Co. (continued)

and all pollution halted within 90 days, or else the Court would consider appointing an outside consultant to recommend whatever necessary be done to halt the pollution, costs to be paid by Crucible Steel.

On March 11, 1971, at 2:00 P.M., the Heyrich Company installed a Cherne plug in the suspected line. A very slight film of oil was noted subsequent to the plug installation, but this could be residual oil from the pipe and banks; however, samples taken on March 23, at 10:30 A. M. and again at 1:00 P.M. showed a low pH, (Acid). Mr. Lubetkin telephoned Mr. Whinn, and confirmed his conversation by a letter dated March 23, requesting that the consultant be immediately informed, so he could locate and halt this acid pollution.

No reply was received, so Mr. Lubetkin wrote again on April 12, informing them that acid was again detected on April 5. The Commissioners received a letter dated April 13, from Mr. W. Bradley, stating they have located the source of acid and setting forth a pre-treatment program to divert this material from the river to the sanitary sewer. The time table showed this will be completed shortly after July 15, 1971. Mr. Lubetkin replied on April 20, 1971, giving neutralization parameters and requesting residual oil be cleared from the sewer.

Observation of their outlet showed that the oil was being cleaned from the banks, slowly, by tidal action, and that the silt from the sewer had a cleaner look (brown not oily black). However, a sample of their discharge on May 18, contained a C. O. D. of 174 ml/l; therefore, Mr. Lubetkin wrote to them on May 26, concerning this and requested an up-to-date progress report on what has been accomplished.

On June 1, 1971, Mr. Bradley wrote to Mr. Lubetkin reporting that the condition of the river banks continues to improve and they feel, they have solved the oil problem. A pH meter had been ordered and a pretreatment acid holding reservoir to the sanitary sewer was completed.

On June 18, Mr. Lubetkin wrote to Crucible that he had observed a small oil slick at 1:15 P. M. and showed the slick to Mr. Art Whinn. Mr. Whinn informed him that an internal inspection had been scheduled for July 1. On June 28,

Crucible Steel Company continued

Mr. Lamborn, Crucible Manager, wrote to Mr. Lubetkin, informing him of an internal check scheduled for July 1. Unfortunately, due to the Public Hearing on Bonds on that date, Mr. Lubetkin was unable to check this himself, but was represented by Mr. L. Cuccinello. On July 16, Judge Lynch advised that a pretrial conference was being scheduled for September 27.

On July 20, Mr. Lubetkin inspected the inside of the sewer with representatives of Crucible. A slight oily film was visible at the mouth, but could not be seen further in the sewer. Therefore, either Crucible's contention that the oil comes from the silt, near the mouth of the sewer, purging itself of old oil was true, or the lack of sufficient light prevented us from seeing the slight sheen indicating the oil.

During August, the discharge was very good, On occassion spots of oil could be seen leaving the outlet, but a study of the water action did reveal, that, as the tide came in, spots of oil from the river, did, in fact, enter the Crucible outlet, and it appeared to be this extremely small amount of oil that is visible leaving the outlet as the tide went out.

During August and September, no pollution could be detected. The outlet area was a mess from the rubble of the storm Doria, but the bank was clean of oil, within the tidal reach. As of the end of September, 1971, this violation is considered eliminated

An automatic pH meter had been installed at the outfall to monitor the discharge to the river. Also, automatic neutralizing equipment was installed at their pretreatment tank to treat the discharge to the sanitary sewer.

At the end of December, the pH meter mal-functioned and had to be sent back to the factory for repairs.
Mr. Lamborn promised to buy a spare so that in the future, a mal-functioning unit would be replaced while it is being repaired.

Violation & Elimination-Curtiss-Wright Corp., 1 Passaic Street, Wood-ridge, New Jersey
Intermittent to March 18, 1971 (J. Perrapato)

The discharge from this company to Feld's Brook intermittently contained oil. Because of complaints of the Commissioners, the company has installed a complete Dorr-Oliver treatment plant for the removal of this oil, however the plant had trouble getting in service, due to problems with the sludge recycling pump and with the caustic and polymer feed systems. Dorr-Oliver had a start-up engineer on the job working on these problems. The Aurora pump people had two men on February 22, checking out the sludge recycling pump and they had the system working for about a day.

August 6, 1971

Passaic Valley Sewerage Commissioners Report
790 Broad Street
Newark, New Jersey

Re: Monthly Report-July, 1971

Gentlemen:

The following is my monthly report which consists of three parts:

City of Clifton-(continued)-

20" Concrete Storm Sewer- Main Avenue & Route 3-This storm sewer located at Main Avenue, north of Route 3 in the rear of the Firehouse, discharges a polluting material into Third River. The pollution generally consists of high coliform and intermittent high C.O.D. and turbidity. The De Camp Bus Lines, at Allwood Road & Main Avenue, has a wash area tied to this storm sewer (see De Camp Bus Lines, page 20) and may be the intermittent source of C. O. D. but they are not the source of the coliform. This sewer is actually a State Highway sewer and has a County sewer (Main Avenue) connecting to it. The City of Clifton sewer Department obtained drawings from the County Engineer office so that the City and the Commissioners can sample this sewer at various locations as soon as dry weather returns.

Violation-Crucible Steel Company, Spalding Works,, 1000 South 4th Street, Harrison, N.J.

A yellowish oily material flowed into the Passaic River from a large culvert owned by this company. This company claimed that a number of other companies leased land on an industrial tract owned by Crucible Steel Company, and the polluting material was not emanating from Crucible Steel itself, but from one of the other tenants, and therefore the Crucible Steel Company would not be liable.

The Commissioners maintained that since the culvert from which this material discharged into the Passaic River was owned by Crucible Steel Company, Crucible Steel Company was liable for any polluting material emanating from the culvert.. Since there seemed to be a difference of opinion concerning liability, the Commissioners instituted a suit against Crucible Steel Company. An Order to Show Cause was originally returnable on May 15, 1970, but was postponed to July 17, 1970, and continued to September 18, 1970..

On September 18 1970, Crucible reported they had eliminated all of the pollution emanating within their own property and had traced oil to other users of the sewer. They requested additional time to check suspected oil sources on the Charles F. Guyon and the Harris and Sons Steel Companies, and perhaps other parties.

Judge Lynch signed a Civil Action Order, bringing in Charles F. Guyon, Inc., Miele Brothers Trucking Company, Azzo Steel Company, Gabest, Inc., Prince Packaging Products, Inc., Joseph Supor Trucking Compay, Rose Ribbon and Barbon Mfg. Co., Inc., (corporations). and Miles A. Galin.

On October 23, 1970, progress reports were submitted and the Commissioners stated that the volume of the pollution had decreased. Crucible was ordered to submit a detailed plan for locating and halting the remaining pollution to Mr. Lubetkin and they were to return to court and report on November 20..

PASSAIC VALLEY SEWERAGE COMMISSIONERS
DEPARTMENT OF SANITATION CONTROL

LABORATORY REPORT

STANDARD METHODS OF ANALYSIS A.P.H.A.

12/4/69 RESULTS EXPRESSED IN PARTS PER MILLION (p.p.m.)

DATE OF SAMPLE Dec. 3, 1969 TIME 11:00 A.M. SAMPLE NO. 52

SAMPLE OF Crucible Steel Co., Cape May St., into Passaic River, Harrison, N. J.

R. Bingham

TOTAL SOLIDS:—		BIOCHEMICAL OXYGEN DEMAND (B.O.D.)	
TOTAL MINERAL		TURBIDITY	16 wp
TOTAL VOLATILE		CHLORINE RESIDUAL	
SOLUBLE SOLIDS:—		COLIFORM (B. coli per ml.) M.P.N.	
SOLUBLE MINERAL		FLAMMABLE	
SOLUBLE VOLATILE		EXPLOSIMETER READING (PERCENT)	
SUSPENDED SOLIDS:—	9 vo	SETTLEABLE SOLIDS (mls. Per Liter)	
SUSPENDED MINERAL	2 vo	pH	3.5 vo
SUSPENDED VOLATILE	7 vo		
ORGANIC NITROGEN			
AMMONIA NITROGEN			
NITRITE NITROGEN			
NITRATE NITROGEN			
TOTAL NITROGEN			
CHLORIDES AS CHLORINE	885 wp		
ALKALINITY AS $CaCO_3$			
OXYGEN CONSUMED (C.O.D.)	58 wp		
DISSOLVED OXYGEN (D.O.)			

REMARKS:
Clear liquid.
No odor.
Trace of grayish sediment.

Alexander O. Ehlers

876970083

PASSAIC VALLEY SEWERAGE COMMISSIONERS
DEPARTMENT OF SANITATION CONTROL

LABORATORY REPORT

STANDARD METHODS OF ANALYSIS A.P.H.A.
RESULTS EXPRESSED IN PARTS PER MILLION (p.p.m.)

DATE OF SAMPLE Feb. 13, 1970 TIME 9:35 A.M. SAMPLE NO 30

SAMPLE OF Crucible Steel 6' x 6' Storm Outlet into Passaic River, Harrison, N. J.

R. Bingham

TOTAL SOLIDS:		BIOCHEMICAL OXYGEN DEMAND (B.O.D.)	
TOTAL MINERAL		TURBIDITY	13 wp
TOTAL VOLATILE		CHLORINE RESIDUAL	
SOLUBLE SOLIDS:		COLIFORM (B. coli per ml.) M.P.N.	
SOLUBLE MINERAL		FLAMMABLE	
SOLUBLE VOLATILE		EXPLOSIMETER READING (PERCENT)	
SUSPENDED SOLIDS:	2 vo	SETTLEABLE SOLIDS (mls. Per Liter)	
SUSPENDED MINERAL	-	pH	4.1 vo
SUSPENDED VOLATILE	-	TEMPERATURE	48°F.
ORGANIC NITROGEN		OIL EXTRACTION	1.5 mg/l
AMMONIA NITROGEN			er
NITRITE NITROGEN			
NITRATE NITROGEN			
TOTAL NITROGEN			
CHLORIDES AS CHLORINE	92 wp		
ALKALINITY AS $CaCO_3$			
OXYGEN CONSUMED (C.O.D.)	43 wp		
DISSOLVED OXYGEN (D.O.)			

REMARKS:
Slightly cloudy liquid.
Slight fine light gray suspended matter.
Slight oily odor.
Trace of oily supernatant.
Slight grayish sediment.

APPROVED

876970084

River Mile (Approx.)	Name	Location and Nature of Outfall	Bank	Source	Field Survey Results
3.0	Mott Street Storm Sewer, Newark	40" storm sewer at foot of Mott St. *41" Mott Street sewer* *36" storm sewer*	West	PVSC/Lubetkin Notebook *FWPCA*	Mott Street outfall verified (P32;R1)
3.0	Charles F. Guyon & Crucible Steel Industrial Site, Harrison	6' x 6' box culvert, south of S. 4th St. 12" storm & cooling water sewer, south of S. 4th St.	East	PVSC/Lubetkin Notebook *FWPCA*	6' x 6' box culvert outfall verified (P29;R2) **Coordinates: Easting 2142710 Northing 693007**
3.3	Polk Street Overflow Sewer, Newark	84" X 96" ELLIPTICAL BRICK SEWER/CSO	West	PVSC/Lubetkin Notebook CSO STUDY	Outfall verified
3.3	River Bank Park, Newark	Several small outfalls from River Bank Park	West	8/9/94 field survey	Outfalls observed (P33;R1)
3.4	Jackson Street Sewer, Newark	56" X 64" ELLIPTICAL BRICK SEWER TERMINATING IN 10' X 5' WOODEN BOX CULVERT/CSO	West	PVSC/Lubetkin Notebook CSO STUDY	Outfall verified
3.5	Welco Gases Corp.	Approx. 4" outfall	West	8/9/94 field survey	Outfall observed
3.5	Public Service Electric & Gas Co. (Harrison Gas Manufacturing Plant)	Two 5' cooling water inlets, north of S. 4th St. 60" x 65" cooling water outlet, north of S. 4th St. *72" pipe*	East	PVSC/Lubetkin Notebook *FWPCA*	Large, grated outfall verified Approx. 18" outfall surrounded by booms observed (P3,4;R1) Approx. 24" outfall observed Additional openings in bulkhead which could conceal outfalls were observed
3.8	South of Raymond Plaza (City Dock), Newark	Several small outfalls observed just south of City Dock	West	8/9/94 field survey	Outfalls observed
3.8	Raymond Plaza Overflow (Formerly City Dock), Newark	108" X 90" RECTANGULAR CONCRETE SEWER/CSO south of RR bridge	West	PVSC/Lubetkin Notebook CSO STUDY	Outfall verified
3.9	North of Raymond Plaza (City Dock), Newark	Approx. 4" outfall observed in bulkhead just north of City Dock	West	8/9/94 field survey	Outfall observed

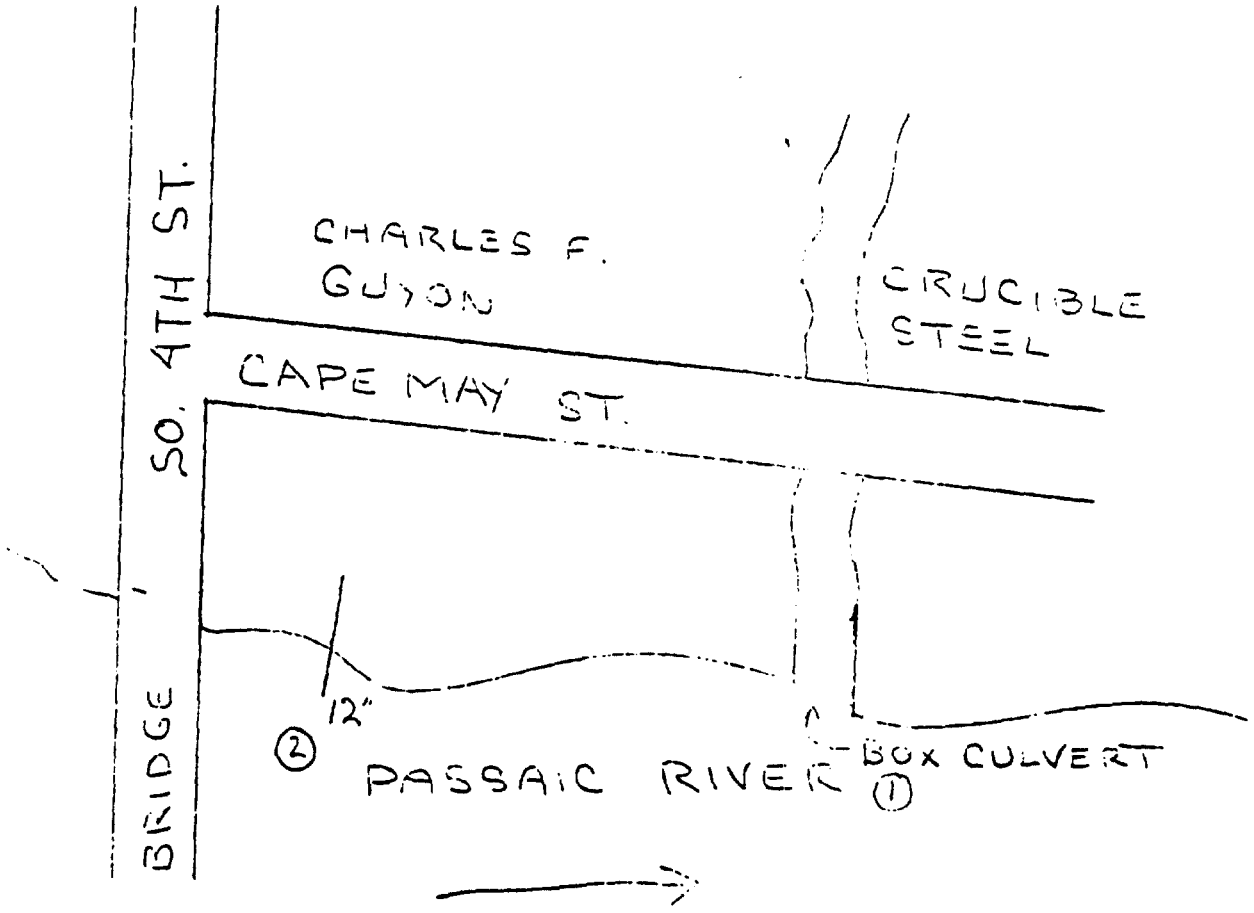
HARRISON

Charles F. Guyon & Crucible Steel Industrial Site.

There are many companies in this industrial site including: Charles F. Guyon, Crucible Steel, Harrison Warehouse, Harris & Son Steel Company, Miele Warehouse Trucking, Joe's Super Trucking, Rose Ribbon Carbon, Super Steel, Remco Industries Storage, and Len & Herb Body Shop.

There are 2 sewers coming from this area.

1. 6 ft. x 6 ft. box culvert.
2. 12" sewer which discharges storm and cooling water from this area.



REPORT ON THE
QUALITY OF THE INTERSTATE WATERS
OF THE
LOWER PASSAIC RIVER AND UPPER AND LOWER BAYS
OF NEW YORK HARBOR

U. S. DEPARTMENT OF THE INTERIOR
U.S. FEDERAL WATER POLLUTION CONTROL ADMINISTRATION.
NORTHEAST REGION.
HUDSON DELAWARE BASINS OFFICE
Edison, New Jersey

November 1969

TABLE 6 ((.)

Map Ident. No.	Source Municipality	River[2/] Mile	Pipe Size	Est. Flow mgd	Temp. °C	BOD mg/l	Total Suspended Solids mg/l	pH	Total Coliform Org./100 ml	Fecal Coliform Org./100 ml	Remarks
19	Interstate Soap Co. [3/] [4/] Newark	3.3	Flow from under building	-	-	-	-		-	-	BOD = >420 mg/l, Ether sol. = 145 mg/l, pH = 5.8 suspended solids = 1104 mg/l
20	Lockwood Street Storm Sewer [3/] Newark	3.4	Undetermined size	-	-	-	-	-	-	-	
21	Benjamin Moore Paint [3/] Newark	3.4	60", 10"	60" = slight	24.5	18.2	178	-	$45x10^4$	$38x10^2$	60" - BOD = 61 mg/l pH = 7.7 [4/]
				10" = .01	21.5	nil	62	-	$73x10^2$	$16x10^1$	10" - BOD = 183 mg/l pH = 7.2 [4/]
22	Sherwin-Williams Newark	3.6	4"	0.05	30.2	nil	132	6.7	$43x10^4$	$90x10^2$	Colored discharge
			12"	0.25	25.0	nil	92	7.4	$60x10^3$	$41x10^2$	
			6"	0.60	25.0	nil	132	7.0	$21x10^4$	$90x10^2$	
			8"x10" opening	0.12	36.0	63.5	120	7.0	$86x10^3$	$33x10^2$	
			7"	0.01	25.0	41.4	14	3.3	10	4	
			3"	-	-	-	-	-	-	-	
			10"	-	-	-	-	-	-	-	
			Several others	-	-	-	-	-	-	-	
23	Barth Smelting & Refining Co. [4/] Newark	4.0	10"	-	-	-	-	-	-	-	pH = 7.3, Ether sol. = 2.0 mg/l
24	Storm Sewer [3/] Newark	4.4	36"	-	-	-	-	-	-	-	
25	Mott Street Storm Sewer [3/] Newark	4.5	41"	0.78	20.5	nil	28	6.0	$15x10^4$	$70x10^2$	
26	Storm Sewer from Ind. Area Harrison	4.6	6'x6'	-	-	-	-	-	-	-	pH = 6.5, Ether sol. = 160 mg/l [4/]
27	Public Service [3/] Harrison	4.8	72"	Small	27.0	nil	164	6.8	$62x10^3$	$27x10^2$	Ether sol. = 363 mg/l [4/]
28	Otis Elevator [3/] Harrison	5.2	18", 8", 6", small pipes	-	-	-	-	-	-	-	Pipes flowing samples could not be taken 8": Ether sol. = 699 mg/l pH = 6.0 [4/]
29	HOPCO Harrison	5.6	4"	0.02	19.0	nil	4	-	$24x10^2$	$12x10^1$	Colored discharge
			4"	0.003	20.5	74.0	8	-	10	4	
			4"	0.09	25.0	nil	132	-	$99x10^3$	$75x10^2$	
			12"	0.20	37.0	92.8	72	-	$68x10^3$	$51x10^2$	
			6"	0.88	24.5	nil	164	-	$10x10^4$	$11x10^3$	
			2½"	Large	24.0	nil	200	-	$20x10^4$	$17x10^3$	
			6"	0.08	37.0	nil	154	-	$79x10^3$	$65x10^2$	
30	Storm Sewer Harrison Harrison Ave	6.1	15"	-	-	-	-	-	-	-	
31	Hillside Metal Products Newark	6.4	8"	0.01	21.0	3.8	50	6.0	$30x10^2$	$56x10^1$	
			8"	0.05	37.0	5.8	60	3.5	$39x10^3$	$35x10^2$	
			6", other pipes	-	-	-	-	-	-	-	
32	Congoleum-Nairn, Inc. [4/] Kearny	7.1	4"	0.3	-	-	-	-	-	-	
33	Pittsburgh Plate Glass Co. Newark	7.3	2-36"	-	-	-	-	-	-	-	Pipes flowing samples could not be taken
			several other pipes	-	-	-	-	-	-	-	

PASSAIC VALLEY SEWERAGE COMMISSIONERS
DEPARTMENT OF SANITATION CONTROL

LABORATORY REPORT

STANDARD METHODS OF ANALYSIS A.P.H.A.

12/4/69 RESULTS EXPRESSED IN PARTS PER MILLION (p.p.m.)

DATE OF SAMPLE Dec. 3, 1969 TIME 11:00 A.M. SAMPLE NO. 52

SAMPLE OF Crucible Steel Co., Cape May St., into Passaic River, Harrison, N. J.

R. Bingham

TOTAL SOLIDS:—		BIOCHEMICAL OXYGEN DEMAND (B.O.D.)	
TOTAL MINERAL		TURBIDITY	16 wp
TOTAL VOLATILE		CHLORINE RESIDUAL	
SOLUBLE SOLIDS:—		COLIFORM (B. coli per ml.) M.P.N.	
SOLUBLE MINERAL		FLAMMABLE	
SOLUBLE VOLATILE		EXPLOSIMETER READING (PERCENT)	
SUSPENDED SOLIDS:—	9 vo	SETTLEABLE SOLIDS (mls. Per Liter)	
SUSPENDED MINERAL	2 vo	pH	3.5 vo
SUSPENDED VOLATILE	7 vo		
ORGANIC NITROGEN			
AMMONIA NITROGEN			
NITRITE NITROGEN			
NITRATE NITROGEN			
TOTAL NITROGEN			
CHLORIDES AS CHLORINE	885 wp		
ALKALINITY AS $CaCO_3$			
OXYGEN CONSUMED (C.O.D.)	58 wp		
DISSOLVED OXYGEN (D.O.)			

REMARKS:
Clear liquid.
No odor.
Trace of grayish sediment.

Alexander O. Ellberg

876970089

PASSAIC VALLEY SEWERAGE COMMISSIONERS
DEPARTMENT OF SANITATION CONTROL

LABORATORY REPORT

STANDARD METHODS OF ANALYSIS A.P.H.A.
RESULTS EXPRESSED IN PARTS PER MILLION (p.p.m.)

DATE OF SAMPLE Feb. 13, 1970 TIME 9:35 A.M. SAMPLE NO 30

SAMPLE OF Crucible Steel 6' x 6' Storm Outlet into Passaic River, Harrison, N. J.
R. Pincher

TOTAL SOLIDS		BIOCHEMICAL OXYGEN DEMAND (B.O.D.)	
TOTAL MINERAL		TURBIDITY	13 wp
TOTAL VOLATILE		CHLORINE RESIDUAL	
SOLUBLE SOLIDS:		COLIFORM (B. coli per ml.) M.P.N.	
SOLUBLE MINERAL		FLAMMABLE	
SOLUBLE VOLATILE		EXPLOSIMETER READING (PERCENT)	
SUSPENDED SOLIDS:	2 wp	SETTLEABLE SOLIDS (ml. Per Liter)	
SUSPENDED MINERAL		pH	6.1 wp
SUSPENDED VOLATILE		TEMPERATURE	48°F.
ORGANIC NITROGEN		OIL EXTRACTION	1.5 mg/l
AMMONIA NITROGEN			or
NITRITE NITROGEN			
NITRATE NITROGEN			
TOTAL NITROGEN			
CHLORIDES AS CHLORINE	92 wp		
ALKALINITY AS $CaCO_3$			
OXYGEN CONSUMED (C.O.D.)	43 wp		
DISSOLVED OXYGEN (D.O.)			

REMARKS:
Slightly cloudy liquid.
Slight fine light gray suspended matter.
Slight oily odor.
Trace of oily supernatant.
Slight grayish sediment.

APPROVED

876970090

D

876970091

COLTEC INDUSTRIES, INC.

TAB D

USEPA "Guides to Pollution Prevention" publications entitled, "Metal Casting and Heat Treating Industry," "The Fabricated Metal Products Industry," and "The Metal Finishing Industry," all identifying hazardous substances associated with operations as conducted on this site.

United States
Environmental Protection
Agency

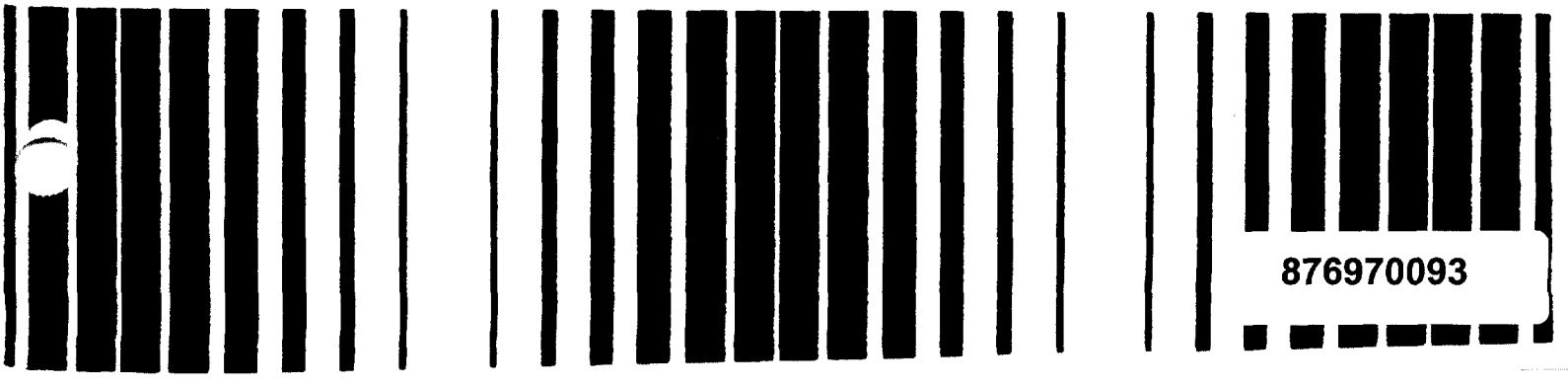
Office of Research and
Development
Washington DC 20460

EPA/625/R-92/009
September 1992

EPA

Guides to Pollution Prevention

Metal Casting and Heat Treating Industry



FOREWORD

This guide identifies and analyzes waste minimization techniques and technologies appropriate for the metal casting and heat treating industries. The guide focuses primarily on source reduction and secondarily on recycling methods.

The majority of waste generated by the metal casting or foundry industry is from melting operations, metal pouring, and disposal of spent molding materials. Generation of waste is directly related to the type of material melted and depends on the types of molds and cores used, as well as the technology employed. The majority of waste generated by the heat treating industry is from spent baths (e.g., cyanide solutions), spent quenchants, wastewater from cleaning parts, spent abrasive media, refractory material, and masking processes.

CONTENTS

SECTION 2
METAL CASTING AND HEAT TREATING INDUSTRY PROFILES

Industry Description

The Standard Industrial Classification (SIC) system categorizes the metal casting and heat treating industries as foundries, casting (SIC 332X, 336X), and metal heat treating (SIC 3398).

This document treats the metal casting and heat treating industries as distinct from other thermally intensive metal industries such as SIC 3312 (steel works, blast furnaces, coke ovens, and rolling mills), SIC 333X (primary/secondary smelting or refining of nonferrous metals), SIC 335X (rolling, drawing, extrusion), and SIC 346X (forging and stamping).

Metal Casting Industry

Metal casting foundries range in size from small job shops to large manufacturing plants that turn out thousands of tons of castings each day. Generation of waste is directly related to the type of material melted (cast iron, steel, brass/bronze, or aluminum) and depends on the type of molds and cores used, as well as the technology employed. Wastes from sand casting operations are inherently greater than those from permanent mold or die casting foundry operations. Therefore, this guide focuses on sand foundries. Table 1 lists the waste generated as a result of metal casting processes.

Table 1. Waste Generating Processes—Metal Casting

Process	Waste
Molding and Coremaking	Spent system sand Sweepings, core butts Dust and sludge
Melting	Dust and fumes Slag
Casting	Investment casting Shells and waxes
Cleaning	Cleaning room waste

PROCESS DESCRIPTION

The sand casting process (Figure 2) begins with patternmaking. A pattern is a specially made model of a component to be produced. Sand is placed around the pattern to make a mold. Molds are usually produced in two halves so that the pattern can be easily removed. When the two halves are reassembled, a cavity remains inside the mold in the shape of the pattern.

Cores are made of sand and a binder and must be strong enough to be inserted into a mold. Cores shape the interior surfaces of a casting that cannot be shaped by the mold cavity surface. The patternmaker supplies core boxes which are filled with specially bonded sand for producing precisely dimensioned cores. Cores are placed in the mold, and the mold is closed. Molten metal is then poured into the mold cavity, where it is allowed to solidify within the space defined by the sand mold and cores.

Molding and Core Making

The molds used in sand casting consist of a particulate refractory material (sand) that is bonded together to hold its shape during pouring. The most common type of molding process is green sand molding. Green sand is typically composed of sand, clay, carbonaceous material, and water. Sand constitutes 85 to 95 percent of the green sand mixture. Often the sand is silica, but olivine and zircon are also used. Approximately 4 to 10 percent of the mixture is clay. The clay acts as a binder, providing strength and plasticity. Carbonaceous materials may make up 2 to 10 percent of the green sand mixture. Carbonaceous materials are added to the mold to provide a reducing atmosphere and a gas film during pouring that protects against oxidation of the metal. Some of the more common carbonaceous materials include sea coal (a finely ground bituminous coal), and proprietary petroleum products. Other carbonaceous materials such as cereal (ground corn starch) and cellulose (wood flour)

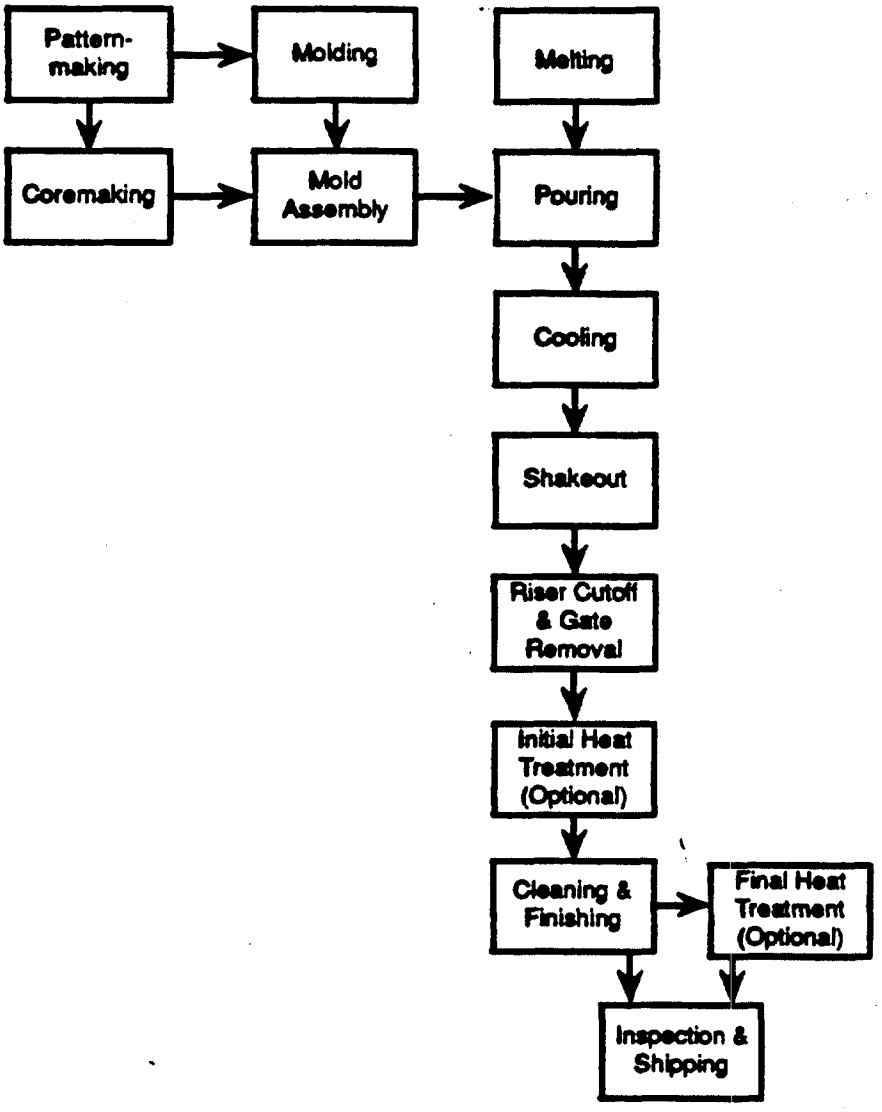


Figure 2. Simplified Flow Diagram of the Basic Operations for Producing a Steel Casting

may be added to control sand expansion defects. Water activates the clay binder and is usually added in small percentages (2 to 5 percent).

Core sands composed of mixtures of sand, with small percentages of binder, are used to produce internal cavities within a casting. Cores must be strong, hard, and collapsible. Often the cores must be removed within a casting through a small orifice and, therefore, the sand must collapse after the casting solidifies.

Core sand is typically silica. Olivine and zircon have also been used when specifications require core sands with higher fusion points or densities. Binder materials to hold the individual grains of sand together vary considerably in composition and binding properties. Oil binders and synthetic binders are common. Oil binders are combinations of vegetable or animal oils and petrochemicals. Typical synthetic resin binders include phenolics, phenolformaldehyde, urea-formaldehyde, urea-formaldehyde/furfuryl alcohol, phenolic-isocyanate, and alkyd isocyanate.

Chemical resin binders are frequently used for foundry cores and less extensively for foundry molds. Chemical binders provide increased productivity, improved dimensional control, and better casting surface quality. A wide variety of binders are available, including:

- Furan acid catalyzed no-bake binders. Furfuryl alcohol is the basic raw material. The binders can be modified with urea, formaldehyde, and phenol. Phosphoric or sulfonic acids are used as catalysts. The amount of resin ranges between 0.9 to 2.0 wt% based on sand weight. Acid catalyst levels vary between 20 to 50 percent based on the weight of binder.

- Phenolic acid catalyzed no-bake binders. These are formed in a phenol/formaldehyde condensation reaction. Strong sulfonic acids are used as catalysts.

- Ester-cured alkaline phenolic no-bake binders. These are formed with a two-part binder system consisting of a water-soluble alkaline phenolic resin and liquid ester co-reactants. Typically 1.5 to 2.0 percent binder based on sand weight and 20 to 25 percent co-reactant based on the resin are used to coat washed and dried silica sand in core and molding operations.

- Silicate/ester-catalyzed no-bake binders. Sodium silicate binder and a liquid organic ester (glycerol diacetate and triacetate or ethylene glycol diacetate) that functions as a hardening agent are used. They may also be catalyzed with CO_2.

- Oil urethane no-bake resins. These resins consist of an alkyd oil type resin, a liquid amine/metallic catalyst, and a polymeric methyl di-isocyanate.

- Phenolic urethane no-bake (PUN) binder.

- Polyol-isocyanate system (mainly for aluminum, magnesium, and other light-alloy foundries). The nonferrous binders are similar to a PUN system consisting of Part I (a phenol formaldehyde resin dissolved in a special blend of solvents), Part II (a polymeric MDI-type isocyanate in solvents), and Part III (an amine catalyst).

- Alumina-phosphate no-bake binder. This binder consists of an acidic, water soluble alumina-phosphate liquid binder and a free-flowing powdered metal oxide hardener.

- Novolac shell-molding binders. Novolac resins of phenol-formaldehyde and lubricant (calcium stearate in the quantity of 4 to 6 percent of resin weight) are used as a cross-linking agent.

- Hot box binders. The resins are classified as furan or phenolic types. The furan types contain furfuryl alcohol, the phenolic types are based on phenol, and the furan-modified has both. Both chloride and nitrate catalysts are used. The binders contain urea and formaldehyde.

- Warm box binders. These consist of a furfuryl alcohol resin that is formulated for a nitrogen content less than 2.5 percent. Copper salts of aromatic sulfonic acids in an aqueous methanol solution are used as catalyst.

Precision foundries often use the investment casting (or the lost-wax) process to make molds. In this process molds are made by building up a shell comprised of alternating layers of refractory slurries and stuccos, such as fused silica, around a wax pattern. The ceramic shells are fired to remove the wax pattern and to preheat the shells for pouring.

Another sand molding process that is finding commercial acceptance uses a polystyrene foam pattern imbedded in loose unbonded traditional sand. The foam pattern left in the sand mold is decomposed by molten metal, hence the process is called "evaporative pattern casting" or the "lost foam process."

Melting

The metal casting process begins with melting metal to pour into foundry molds. Cupola, electric arc, induction, hearth (reverberatory), and crucible furnaces are all used to melt metal.

The cupola furnace (patented in 1794) is the oldest type of furnace used in the metal casting industry and is still used for producing cast iron. It is a fixed bed cylindrical shaft furnace, in which alternate layers of metal scrap and ferroalloys, together with foundry

coke and limestone or dolomite, are charged at the top. The metal is melted by direct contact with a counter-current flow of hot gases from the coke combustion. Molten metal collects in the well, where it is discharged by intermittent tapping or by continuous flow. Conventional cupola furnaces are lined with refractory to protect the shell against abrasion, heat, and oxidation. Lining thickness ranges from 4.5 to 12 inches. The most commonly used lining is fireclay brick, or block. As the heat progresses, the refractory lining in the melting zone is progressively fluxed away by the high temperature and oxidizing atmosphere and becomes part of the furnace slag.

A cupola furnace is usually equipped with an emission control system. The two most common types of emission collection are the high-energy wet scrubber and the dry baghouse. High-quality foundry grade coke is used as a fuel source. The amount of coke in the charge usually falls within a range of 8 to 16 percent of the metal charge. Coke burning is intensified by blowing oxygen enriched air through nozzles.

Electric arc furnaces are used primarily by large steel foundries and steel mills. Heat is supplied by an electrical arc established from three carbon or graphite electrodes. The furnace is lined with refractories that deteriorate during the melting process, thereby generating slag. Protective slag layers are formed in the furnace by intentional addition of silica and lime. Fluxes such as calcium fluoride may be added to make the slag more fluid and easier to remove from the melt. The slag protects the molten metal from the air and extracts certain impurities. The slag removed from the melt may be hazardous depending on the alloys being melted.

Metal scrap, shop returns (such as risers, gates, and casting scrap), a carbon raiser (or carbon rich scrap), and lime or limestone are added to the furnace charge. Fume and dust collection equipment controls air emissions from the electric arc furnace.

Induction furnaces have gradually become the most widely used furnaces for melting iron and, increasingly, for nonferrous alloys. These furnaces have excellent metallurgical control and are relatively pollution free. Induction furnaces are available in capacities from a few pounds to 75 tons. Coreless induction furnaces are more typically in the range of 5 tons to 10 tons. In a coreless furnace, the refractory-lined crucible is completely surrounded by a water-cooled copper coil. In channel furnaces, the coil surrounds an inductor. Some large channel units have a capacity of over 200 tons. Channel induction furnaces are commonly used as holding furnaces.

Induction furnaces are alternating current electric furnaces. The primary conductor is a coil, which generates a secondary current by electromagnetic induction. Silica (SiO_2), which is classified as an acid; alumina (Al_2O_3), classified as neutral; and magnesia (MgO), classified as a basic material, are typically used as refractories. Silica is often used in iron melting because of its low cost and because it does not readily react with the acid slag produced when melting high silicon cast iron.

Reverberatory (hearth) and crucible furnaces are widely used for batch melting of nonferrous metals such as aluminum, copper, zinc, and magnesium. In a crucible furnace, the molten metal is contained in a pot-shaped shell (crucible). Electric heaters or fuel-fired burners outside the shell generate the heat that passes through the shell to the molten metal. In many metal-melting operations, slag or dross builds up at the metal surface line, and heavy unmelted slush residue collects on the bottom. Both of these residues shorten crucible life and must be removed and either recycled or managed as waste.

Casting

Once the molten metal has been treated to achieve the desired properties, it is transfered to the pouring area in refractory-lined ladles. Slag is removed from the bath surface and the metal is poured into molds. When the poured metal has solidified and cooled, the casting is shaken out of the mold, and the risers and gates are removed. Fumes or smoke from the metal pouring area are typically exhausted to a dust collection device such as a baghouse.

Cleaning

After cooling, risers and runners are removed from the casting using bandsaws, abrasive cut-off wheels, or arc cut-off devices. Parting line flash is removed with chipping hammers. Contouring of the cut-off areas and parting line is done with grinders. Castings may be weld-repaired to eliminate defects.

After mechanical cleaning, the metal casting is blast cleaned to remove casting sand, metal flash, or oxide. In blast cleaning, abrasive particles, usually steel shot or grit, are propelled at high velocity onto the casting surface to remove surface contaminants. For aluminum castings, the process provides a uniform cosmetic finish, in addition to cleaning the workpiece.

High-carbon steel shot is typically used to clean ferrous castings; sometimes a shot and grit mixture is used. In the past, chilled iron grit and malleable abrasives were used. Aluminum castings are sandblasted typically using an abrasion-resistant sand or crushed slag.

Cast components that require special surface characteristics (such as resistance to deterioration or an appealing appearance) may be coated. Chemical cleaning and coating operations may be performed at the foundry, but often are performed off site at firms specializing in coating operations. The most important prerequisite of any coating process is cleaning the surface. The choice of cleaning process depends not only on the types of soil to be removed, but also on the characteristics of the masking to be applied; typical coating operations include electroplating, hardfacing, hot dipping, thermal spraying, diffusion, conversion, porcelain enameling, and organic or fused dry-resin coating. The cleaning process must leave the surface in a condition that is compatible with the coating process. For example, if a casting is to be treated with phosphate and then painted, all oil and oxide scale must be removed because these inhibit good phosphating. If castings are heat treated before they are coated, the choice of heat treatment conditions can influence the properties of the coating, particularly a metallic or conversion coating. In most cases, castings should be heat treated in an atmosphere that is not oxidizing.

Molten salt baths, pickling acids, alkaline solutions, organic solvents, and emulsifiers are the basic materials used in cleaning operations. Molten salt baths may be used to clean complex interior passages in castings. In one electrolytic, molten salt cleaning process, the electrode potential is changed so that the salt bath is alternately oxidizing and reducing. Scale and graphite are easily removed with reducing and oxidizing baths, respectively. Molten salt baths clean faster than other nonmechanical methods, but castings may crack if they are still hot when salt residues are rinsed off with water.

Parts are usually pickled in an acid bath prior to hot dip coating or electroplating. Overpickling should be avoided because a graphite smudge can form on the surface. Because cast iron contains silicon, a film of silica also can form on the surface as a result of heavy pickling. This film can be avoided by adding hydrofluoric acid to the pickling bath.

Chemical cleaning differs from pickling in that chemical cleaners attack only the surface contaminants, not the iron substrate. Many chemical cleaners are proprietary formulations; but, in general, they are alkaline solutions, organic solvents, or emulsifiers. Alkaline cleaners must penetrate contaminants and wet the surface to be effective. Organic solvents commonly used in the past (naphtha, benzene, methanol, toluene, and carbon tetrachloride) have been largely replaced by chlorinated solvents, such as those used for vapor degreasing. Solvents effectively remove lubricants, cutting oils, and coolants; but are ineffective against oxides or salts. Emulsifiers are solvents combined with surfactants; they disperse contaminants and solids by emulsification. Emulsion cleaners are most effective against heavy oils, greases, sludges, and solids entrained in hydrocarbon films. They are relatively ineffective against adherent solids such as oxide scale.

After wet cleaning, an alkaline rinse is used on casting to prevent short-term rust. This can be followed by treatment with mineral oils, solvents combined with inhibitors and film formers, emulsions of petroleum-base coatings and water, and waxes.

Coating

Castings are coated using plating solutions, molten metal baths, alloys, powdered metals, volatilized metal or metal salt, phosphate coatings, porcelain enamels, and organic coatings.

WASTE DESCRIPTION

Product castings manufactured by foundries generate the following wastes:

- Spent system sand from molding and core making operations and used core sand not returned to the system sand (sweepings, core butts)
- Investment casting shells and waxes
- Cleaning room waste
- Dust collector and scrubber waste
- Slag
- Miscellaneous waste.

Spent Foundry Sand

Most foundries reuse some portion of their core making and molding sand; in many cases most of the sand is reused. Green sand is reused repeatedly. Fines build up as sands are reused, and a certain amount of system sand must be removed regularly to maintain the desired sand properties. The removed sand, combined with the sand lost to spills and shakeout, becomes the waste sand. Figure 3 illustrates the primary sources of waste sand.

Dust and sludge produced from molding sand are often collected as part of an air pollution control system located over the molding and shakeout operations. Waste can also be in the form of large clumps that are screened out of the molding sand recycle system or in the form of sand that has been cleaned from the castings.

Core sand binders either partially or completely degrade when exposed to the heat of the molten metal during the pouring operation. Once loose, sand that has had its binder fully degraded is often mixed with molding sand for recycling or is recycled back into the core sand process. Core butts are partially decomposed core sand removed during shakeout. They contain only partially degraded binder. The core butts can be crushed and recycled into the molding sand process, or may be taken to a landfill along with broken or offspec cores and core room sweepings. Molding sand and core sand waste accounts for 66 to 88 percent of the total waste generated by ferrous foundries.

Brass or bronze foundries may generate hazardous waste sand contaminated with lead, copper, nickel, and zinc, often in high total and extractable concentrations. Some core-making processes use strongly acidic or basic substances for scrubbing the offgases from the core making process. In the free radical cure process, acrylic-epoxy binders are cured using an organic hydroperoxide and SO_2 gas. A wet scrubbing unit absorbs the SO_2 gas. A 5 to 10 percent solution of sodium hydroxide at a pH of 8 to 14 neutralizes the SO_2 and prevents the by-product (sodium sulfite) from precipitating out of solution. Usually, pH controlled sludges are discharged to the sewer system as nonhazardous waste. If not properly treated, the waste may be classified as hazardous corrosive waste.

Investment Casting Waste

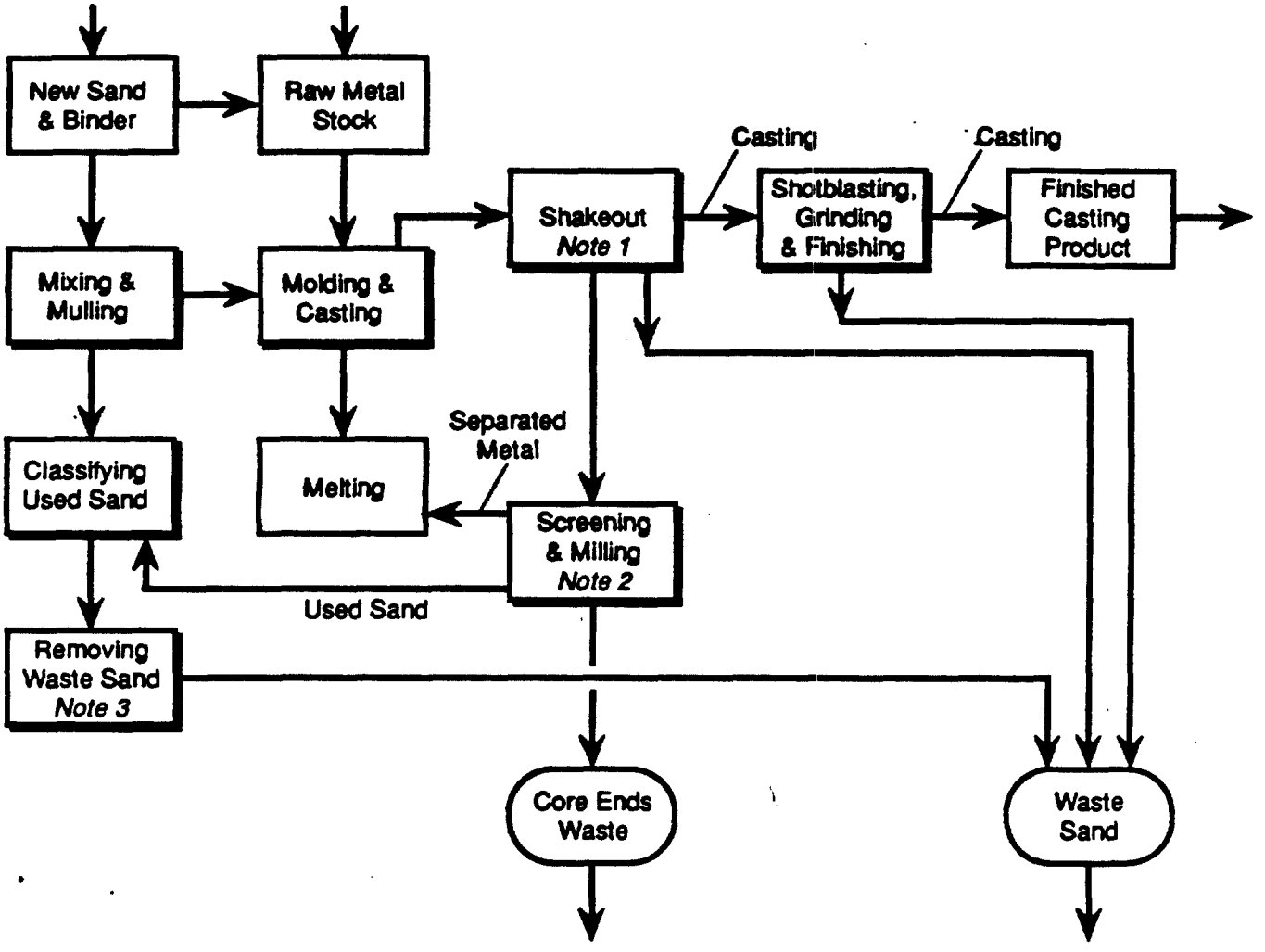
Investment casting shells can be used only once and are disposed in landfills as a nonhazardous waste unless condensates from heavy metal alloy constituents are present in the shells. Waxes that are removed from the casting shells can be recycled back into wax sprues and runners for further reuse or can be sent to a wax recycling operation for recovery.

Cleaning Room Waste

Cleaning room waste that is ultimately disposed in a landfill includes used grinding wheels, spent shot, floor sweepings, and dust from the cleaning room dust collectors. This waste may be hazardous if it contains excessive levels of toxic heavy metals.

Dust Collector and Scrubber Waste

During the melting process, a small percentage of each charge is converted to dust or fumes collected by baghouses or wet scrubbers. In steel foundries, this dust contains varying amounts of zinc, lead, nickel, cadmium, and chromium. Carbon-steel dust tends to be high in zinc and lead as a result of the use of galvanized scrap, while stainless steel dust is high in nickel and chromium. Dust associated with nonferrous metal production may contain copper, aluminum, lead, tin, and zinc. Steel dust may be encapsulated and disposed of in a permitted landfill, while



Note 1 Removing the molding sand from the casting
Note 2 Breaking up large chunks and separating metal pieces
Note 3 Accommodating the new sand and binder

Figure 3. Primary Sources of Waste Sand

nonferrous dust is often sent to a recycler for recovery of metal.

Slag Waste

Slag is a fairly complex, relatively inert glassy mass with a complex chemical structure. It is composed of metal oxides from the melting process, melted refractories, sand, coke ash (if coke is used), and other materials. Slag may be conditioned by fluxes to facilitate removal from the furnace.

Hazardous slag may be produced in melting operations if the charge materials contain significant amounts of toxic metal such as lead, cadmium, and chromium.

To reduce the sulfur content of iron, some foundries use calcium carbide desulfurization in the production of ductile iron. The calcium carbide desulfurization slag generated by this process may be classified as a reactive waste.

Miscellaneous Waste

Most foundries generate miscellaneous waste that varies greatly in composition, but makes up only a small percentage of the total waste. This waste includes welding materials, waste oil from forklifts and hydraulics, empty drums of binder, and scrubber lime.

Heat Treating Industry

Heat treating refers to the heating and cooling operations performed on metal workpieces to change their mechanical properties, their metallurgical structure, or their residual stress state. Heat treating includes stress-relief treating, normalizing, annealing, austenitizing, hardening, quenching, tempering, martempering, austempering, and cold treating. Annealing, as an example, involves heating a metallic material to, and holding it at, a suitable temperature, followed by furnace cooling at an appropriate rate. Steel castings may be annealed to facilitate cold working or machining, to improve mechanical or electrical properties, or to promote dimensional stability. Gray iron castings may be annealed to soften them or to minimize or eliminate massive eutectic carbides, thus improving their machinability.

PROCESS DESCRIPTION

Heating, quenching, descaling, cleaning, and masking operations generate most of the waste in the heat treating industry. Table 2 lists the waste generating processes and waste characteristics.

Heat Treating Other Than Case Hardening

Heat treating is performed in conventional furnaces, salt baths, or fluidized-bed furnaces. The basic conventional furnace consists of an insulated chamber with an external reinforced steel shell, a heating system for the chamber, and one or more access doors to the heated chamber. Heating systems are direct fired or indirect heated. With direct-fired furnace equipment, work being processed is directly exposed to the products of combustion, generally referred to as flue products. Gas- and oil-fired furnaces are the most common types of heat treating equipment. Indirect heating is performed in electrically heated furnaces and radiant-tube-heated furnaces with gas-fired tubes, oil-fired tubes, or electrically heated tubes. The heating operations (e.g., stress-relief, normalizing, annealing, austenitizing, tempering, martempering, and austempering) do not generate hazardous waste. Refractory materials (furnace lining) are the only wastes generated, and they are disposed of as nonhazardous waste.

Table 2. Waste Generating Processes—Heat Treating

Process	Waste
Heat Treating	Refractory material
Case Hardening	Spent salt baths
Quenching	Spent quenchants
Descaling	Spent abrasive media
Cleaning and Masking	Solvents, abrasives Copper plating waste

To obtain better thermal control and more rapid heating rates, salt bath furnaces are commonly used. Salt bath furnaces consist of pots of molten salt heated by direct resistance methods (an electric current is passed through the salt) or by indirect fossil fuel or electric resistance methods (the pot is placed within a furnace-like enclosure).

In the fluidized-bed furnace, gas is passed up through a bed of dry, finely divided particles, typically aluminum oxide. The turbulent motion and rapid circulation of the particles in the furnace provide heat-transfer rates comparable to those of conventional salt-bath equipment. The parts to be treated are submerged in a bed of fine solid particles held in suspension by an upward flow of gas. Heat input to a fluidized bed can be achieved using:

- Internal-resistance-heated beds: the gas and particles are heated by suitably sheathed internal-resistance heated elements

- External-resistance heated beds: a fluidized bed contained in a heat-resisting pot is heated by external resistance elements
- Direct-resistance heated beds: an electrically conducting material such as carbon powder or silicon carbide is employed as the bed material
- External-combustion heated beds: a fluidized bed, contained in a heat-resisting pot, is heated by external gas firing
- Submerged-combustion fluidized beds: the combustion products pass directly through the mass to be heated
- Internal-combustion gas-fired beds: an air/gas mixture is used for fluidization and ignited in the bed, generating heat by internal combustion.

Drag-out loss of the fluidized-bed particles that are removed by agitating, bouncing, and gas blowing can be minimized by water spraying. Recovered particles can then be reused after being dried, sieved, and returned to the bed.

Case Hardening

Case hardening processes supply an adequate quantity of carbon or nitrogen for absorption and diffusion into the steel. These processes are carried out in either gas-phase furnaces or in salt-bath furnaces that are similar to the furnaces used for other heat treating processes. Case hardening performed in liquid media is the major source of waste.

These baths are used in liquid carburizing, liquid cyaniding (carbonitriding), and liquid nitriding processes that are classified as steel case hardening processes. Table 3 shows the operating composition of liquid carburizing baths. Low-temperature cyanide-type carburizing baths (light case baths) usually are operated in the temperature range of 845 to 900C (1550 to 1650F), although for certain effects this operating range sometimes is extended to 790 to 925C (1450 to 1700F). High-temperature cyanide-type carburizing baths (deep case baths) usually are operated in the temperature range of 900 to 955C (1650 to 1750F). Liquid cyaniding (carbonitriding) baths typically are operated at temperatures of 815 to 850C (1500 to 1560F). The composition of both low-temperature and high-temperature baths is provided to satisfy individual requirements for carburizing activity (carbon potential) within the limitations of manual drag-out and replenishment.

Table 4 shows the compositions and properties of sodium cyanide mixtures used in liquid cyaniding processes that produce a file-hard, wear-resistant surface on ferrous parts. A sodium cyanide mixture such as grade 30 in Table 4, is generally used for cyaniding on a production basis. This mixture is preferable to any of the other compositions given in Table 4. The inert salts of sodium chloride and sodium carbonate are added to cyanide to provide fluidity and to control the melting points of all mixtures.

Liquid nitriding is performed in a molten salt bath composed of a typical mixture of sodium and potassium salts. The sodium salts, which comprise 60 to 70 percent (by weight) of the total mixture, consist of 96.5 percent NaCN, 2.5 percent Na_2CO_3, and 0.5 percent NaCNO. The potassium salts, 30 to 40 percent (by weight) of the mixture, consist of 96 percent KCN, 0.6 percent K_2CO_3, 0.75 percent KCNO, and 0.5 percent KCl. The cyanate content in all liquid nitriding baths is responsible for the nitriding action, and the ratio of cyanide to cyanate is critical.

Cyanide-containing baths used in liquid carburizing, liquid cyaniding, and liquid nitriding processes undergo an aging process that generates undesirable products of oxidation. Aging decreases the cyanide content of the bath and increases the cyanate and carbonate content. In a low-temperature cyanide-type bath, several reactions occur simultaneously, depending on bath composition, to produce the following various end products and intermediates: carbon (C), alkali carbonate (Na_2CO_3 or K_2CO_3), nitrogen (N_2 or 2N), carbon monoxide (CO), carbon dioxide (CO_2), cyanamide (Na_2CN_2 or $BaCN_2$), and cyanate (NaNCO). Two of the major reactions believed to occur in the operating bath are the "cyanamide shift" and the formation of cyanate:

$$2\,NaCN \leftrightarrow Na_2CN_2 + C \quad (1)$$

and either

$$2\,NaCN + O_2 \rightarrow NaNCO \quad (2)$$

or

$$NaCN + CO_2 \leftrightarrow NaNCO + CO \quad (3)$$

Table 3. Operating Composition of Liquid Carburizing Baths

Constituent	Composition of Bath, %	
	Light Case, Low Temperature - 845 to 900°C (1550 to 1650°F)	Deep Case, High Temperature 900 to 955°C (1650 to 1750°F)
Sodium cyanide	10 to 23	6 to 16
Barium chloride	—	30 to 55[a]
Salts of other alkaline earth metals[b]	0 to 10	0 to 10
Potassium chloride	0 to 25	0 to 20
Sodium chloride	20 to 40	0 to 20
Sodium carbonate	30 max	30 max
Accelerators other than those involving compounds of alkaline earth metals[c]	0 to 5	0 to 2
Sodium cyanate	1.0 max	0.5 max
Density of molten salt	1760 kg/m^3 at 900°C (110 lb/ft^3 at 1650°F)	2000 kg/m^3 at 925°C (125 lb/ft^3 at 1700°F)

(a) Proprietary barium chloride-free deep-case baths are available.
(b) Calcium and strontium chlorides have been employed. Calcium chloride is more effective, but its hygroscopic nature has limited its use.
(c) Among these accelerators are manganese dioxide, boron oxide, sodium fluoride, and sodium pyrophosphate.

Table 4. Compositions and Properties of Sodium Cyanide Mixtures for Cyaniding Baths

Constituent or Property	Grade			
	96-98[a]	75[b]	45[b]	30[b]
Composition, %				
Sodium cyanide	97	75	45.3	30.0
Sodium carbonate	2.3	3.5	37.0	40.0
Sodium chloride	Trace	21.5	17.7	30.0
Melting point, °C (°F)	560 (1040)	590 (1095)	570 (1060)	625 (1155)
Specific gravity				
At 25°C (75°F)	1.50	1.60	1.80	2.09
At 860°C (1580°F)	1.10	1.25	1.40	1.54

(a) Appearance: white crystalline solid. This grade also contains 0.5% sodium cyanate (NaNCO) and 0.2% sodium hydroxide (NaOH); sodium sulfide (Na_2S) content is nil.
(b) Appearance: white granular mixture.

Reactions that influence cyanate content proceed as follows:

$$NaNCO + C \rightarrow NaCN + CO \quad (4)$$

and either

$$4\ NaNCO + 2\ O_2 \rightarrow 2\ Na_2CO_3 + 2\ CO + 4\ N \quad (5)$$

or

$$4\ NaNCO + 4\ CO_2 \rightarrow 2\ Na_2CO_3 + 6\ CO + 4\ N \quad (6)$$

Reactions (5) and (6) deplete the activity of the bath. Oxidation products in the bath media promote unfavorable temperature gradients. In liquid nitriding, the carbonate content is kept below 25 percent. Carbonate content is usually lowered by cooling the bath to 850°F and allowing precipitated salt to settle to the bottom of the salt pot. Another contaminant that forms in the bath is a complex sodium ferrocyanide $Na_4Fe(CN)_6$ that is removed by holding the bath at 649°C for about two hours to settle out the compound in the form of sludge.

The salt baths in liquid carburizing, liquid nitriding, and liquid cyaniding processes are considered hazardous when spent. Typical baths contain molten sodium, potassium cyanide, and cyanate salts. In liquid carburizing, nitriding, and cyaniding, the parts are held at an appropriate high temperature in a molten salt. In carburizing processes, after the workpiece is heat treated, it undergoes quenching for the purpose of hardening. The quenching media becomes contaminated with the cyanide used in case hardening and must be disposed of as hazardous waste. Spent quenching oil or wastewater generated in the cyanide heat treating cycle (liquid carburizing or cyaniding) becomes hazardous waste because cyanide salts are transferred to the oil bath or water bath as a result of drag-out. Gas carburizing burns natural gas in a sealed furnace and produces no hazardous waste. Gas nitriding employs ammonia gas to supply the nitrogen and produces no solid hazardous waste.

Some case hardening processes require source materials from which carbon and nitrogen can be generated. After the case hardening is completed, these spent source materials may be hazardous waste.

Salts that contain barium compounds are sources of hazardous waste. These salts are used in high temperature applications such as hardening high-speed steel, hot work steels, and other air hardening tool steels.

Quenching

Quenching is an integral part of liquid carburizing, liquid cyaniding, and liquid nitriding. When the surface of the steel absorbs a sufficient quantity of carbon or nitrogen from a hot molten salt bath, the part is often quenched in mineral oil, paraffin-base oil, water, or brine to develop a hard surface layer. Tool steels that are liquid nitrided are not normally quenched, but are cooled.

Quenching, a cooling operation in metal heat treating, can be accomplished by immersing a hot workpiece in water, oil, polymer solution, or molten salt, depending on the cooling rate required. In spray quenching, streams of quenching liquid are applied to local areas of a hot workpiece at pressures up to 120 psi. Fog quenching is the application of a fine fog or mist of liquid droplets and the gas carrier as cooling agents. Gas quenching cools faster than still air and slower than oil. Water (3 to 5 percent caustic solutions) and brine (5 to 10 percent sodium chloride) are the quenchants most commonly used for carbon steel. A water soluble polymer is sometimes used to modify the quenching rate of a water quench. Oil quenching is less drastic than water quenching and produces less distortion. Commonly used quenchants are mineral oils fortified with nonsaponifiable additives that increase their quenching characteristics and lengthen their useful lives. Parts should never be transferred directly from a cyanide-containing carburizing bath to a nitrate-nitrite quench bath. This can result in a violent reaction and may cause an explosion.

A complete quenching system consists of a work tank or machines, facilities for handling the parts quenched, quenching medium, equipment for agitation, coolers, heaters, pumps and strainers or filters, quenchant supply tank, equipment for ventilation and for protection against hazards, and equipment for automatic removal of scale from tanks. Quenching is a significant source of waste in the heat treating industry. The waste consists of spent quenching media in the form of spent baths and wastewater generated when quenched workpieces are washed to

remove either salt or oil that remains after the quenching process.

Descaling

The intense heat of air or atmosphere in furnaces may cause an oxide scale to form on the surface of workpieces. Before further processing can take place, this scale must be removed. Descaling can be accomplished by abrasive cleaning (sandblasting) or by pickling. In pickling, the workpiece is immersed in a hot acid bath (usually sulfuric, nitric, or hydrochloric acid) to clean the surface of all impurities. The acid dissolves the metal oxide and ferric oxide rust and scale. The workpiece is then rinsed in water to remove the acid and, in some cases, is bathed in oil or another special coating.

Parts Cleaning and Surface Masking

Supportive operations in heat treating (such as parts cleaning or surface masking) generate hazardous waste. Masking by plating prevents carburizing or nitriding of a metal workpiece or selected parts of a workpiece during the heating cycle. Plated deposits of bronze or copper are the most common coatings. Nickel (including electroless nickel), chrome, and silver are effective also, but their higher cost restricts their use to special applications. When the application does not permit the retention of any protective plate on the finished part after heat treating, selection of the coating is important from the standpoint of subsequent stripping. Copper and silver are the easiest to strip; bronze is more difficult. Nickel is very difficult to remove without detrimentally affecting the part. Therefore, copper plating is most widely used.

Cleaning parts is of great concern in plating and case hardening processes. In liquid nitriding processes, for example, all workpieces placed in the bath should be thoroughly cleaned and free of surface oxide, entrapped sand, oil and grease, and metal particles. Either acid pickling or abrasive cleaning is recommended prior to nitriding. Most parts are successfully nitrided immediately after vapor degreasing. However, some machine finishing processes (such as buffing, finish grinding, lapping, and burnishing) may produce surfaces that retard nitriding and result in uneven case depth and distortion even after cleaning.

There are two ways to condition the surfaces of parts finished by such methods. One method consists of vapor degreasing and abrasive cleaning with aluminum oxide grit immediately prior to liquid nitriding (residual grit must be brushed off before parts are loaded into the furnace). The second is to apply a light phosphate coating.

WASTE DESCRIPTION

Spent cyanide baths, spent quenchants, wastewater generated in parts cleaning operations, spent abrasive media, refractory material, and plating generate the most waste in the heat treating industry. The following sections characterize waste from case hardening baths and pots, quenchant baths, and parts cleaning and masking operations.

Case Hardening Baths and Salt Pots

A significant amount of waste is generated in heat treating operations where cyanide-containing baths are used. In normal bath maintenance routines, sludge collected at the bottom of the pot is removed on a daily basis. It is usually spooned from the bottom with a perforated ladle. This sludge must be disposed of and treated as waste. In liquid carburizing, sludge is removed while the furnace is still at idling temperature. The electrodes of internally heated furnaces are scraped clean. As the bath media is depleted, bath pots corrode. To minimize corrosion of the pot at the air-salt interface, salts are completely changed every three or four months.

Quenching

Cyanide salts on the part contaminate the quenching bath, rendering the bath a hazardous waste when spent.

Salt that adheres after the parts reach room temperature must be washed off, usually in water.

Waste is generated in the following form:

- Residue (salt sludge) from oil baths used for quenching cyanided and liquid carburized and nitrided parts

- Spent water and brine quenchants used for liquid cyanided, liquid carburized, and liquid nitrided parts

- Quenching process drag-out waste from other than case hardening processes.

Another source of waste is the quenchant media washing operation. Drag-out in the form of oil is removed from the part by hot water washing. Oil is one of the most commonly used quenchants in the heat treating industry, therefore the quantity of waste oil that needs to be handled as a hazardous waste is subtantial.

Parts Cleaning and Masking

Additional sources of hazardous waste in the heat treating industry are parts cleaning and masking operations. Solvent cleaning, aqueous cleaning, and abrasive cleaning wastes are generated for disposal or treatment.

The most popular masking operation is copper plating. The hazardous wastes generated in this process are identical to metal finishing industry wastes. For more information on the types of hazardous waste generated in plating operations see USEPA *Guides to Pollution Prevention: The Fabricated Metal Industry* (Appendix B), USEPA *Guides to Pollution Prevention: the Metal Finishing Industry* (Appendix B), and DHS, *Waste Audit Study* (1989, 1990).

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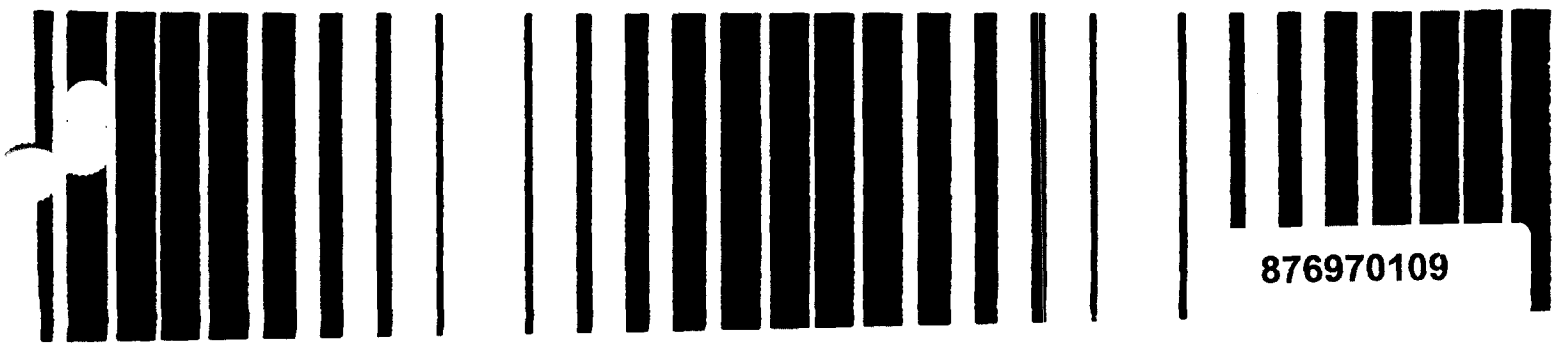
Technology Transfer

EPA

Guides to Pollution Prevention

The Fabricated Metal Products Industry



FOREWORD

This guide provides an overivew of the metal fabrication processes and operations that generate waste and presents options for minimizing waste generation through source reduction and recycling. Such processes are an integral part of aerospace, electronic, defense, automotive, furniture, domestic appliance, and many other industries. Fabricated metal processes generate various hazardous waste streams, including oily wastes from machining operations, heavy metal-bearing streams from surface treatment and plating operations, and additional wastes related to paint application.

Reducing the generation of these wastes at the source or recycling the wastes on- or off-site will benefit the metal fabricating industry by reducing raw material needs, reducing disposal costs, and lowering the liabilities associated with hazardous waste disposal.

CONTENTS

SECTION 2
FABRICATED METAL INDUSTRY PROFILE

Industry Description

Fabricated metal products are classified under Standard Industrial Classification (SIC) 34, and include industries engaged in processes that machine, treat, coat, plate, paint and clean metal parts. There are two major segments of the industry: job shops that process materials owned by other parties on a contractual basis, and captive shops that are owned and part of larger manufacturing facilities. Metal fabrication processes are integral parts of aerospace, electronic, defense, automotive, furniture, domestic appliance, and many other industries. Fabricated metal processes generate various hazardous waste streams, including oily wastes from machining operations, heavy metal-bearing streams from surface treatment and plating operations, and solvents, alkaline and acid solutions from metal cleaning and stripping operations, and additional wastes related to paint application. Each of the major waste generating processes is profiled below.

Machining Operations

Machining operations involve various metal cutting processes that include:

- turning
- drilling
- milling
- reaming
- threading
- broaching
- grinding
- polishing
- planing
- cutting and shaping

Machining processes use cutting tools of some sort that travel along the surface of the workpiece, shearing away the metal ahead of it. Most of the power consumed in cutting is transformed into heat, the major portion of which is carried away by the metal chips, while the remainder is divided between the tool and workpiece. Interface temperatures of up to 200°F have been measured (Baumeister 1967).

Turning processes and some *drilling* are done on lathes, which hold and rapidly spin the workpiece against the edge of the cutting tool. *Drilling* machines are intended not only for making holes, but for *reaming* (enlarging or finishing) existing holes. This process is also carried out by reaming machines using multiple cutting edge tools. *Milling* machines also use multiple edge cutters, in contrast with the single point tools of a lathe. While drilling cuts a circular hole, milling can cut unusual or irregular shapes into the workpiece.

Broaching is a process whereby internal surfaces such as holes of circular, square or irregular shapes, or external surfaces like keyways are finished. A many-toothed cutting tool called a broach is used in this process. The broach's teeth are graded in size in such a way that each one cuts a small chip from the workpiece as the tool is pushed or pulled either past the workpiece surface, or through a leader hole (Baumeister 1967). Broaching of round holes often gives greater accuracy and better finish than reaming.

METALWORKING FLUIDS

Metalworking fluids are those liquids (or sometimes gases) that are applied to the workpiece and cutting tool in order to facilitate the cutting operation. A metalworking fluid is used:

1) to keep tool temperature down, preventing premature wear and damage;
2) to keep workpiece temperature down, preventing it from being machined to a warped shape or within inaccurate dimensions;
3) to provide a good finish on the workpiece;
4) to wash away chips; and
5) to inhibit corrosion or surface oxidation of the workpiece.

Also, and very important, metalworking fluids are frequently used to lubricate the tool-workpiece interface, in addition to simply cooling it.

Metalworking fluids can be air-blasted, sprayed or drawn through suction onto the tool-workpiece interface. Types of fluids include water (either plain or containing an alkali); emulsions of a soluble oil or paste; and "straight" oils (those that are not water-based) such as mineral, sulphurized, or chlorinated oil.

Air drafts are often used with grinding, polishing and boring operations to remove dust and chips, and to cool to a certain extent. *Aqueous solutions* containing approximately one percent by weight of an alkali such as borax, sodium carbonate or trisodium phosphate exhibit high cooling properties and also provide corrosion prevention for some materials. These solutions are inexpensive and sometimes are used for grinding, drilling, sawing, and light milling and turning operations (Baumeister 1967).

Emulsions consist of a suspension of oil or paste in water, typically at the ratio of one part oil to 10 to 100 parts water, depending on the application. Rich mixtures of oil to water are used for broaching, threading and gear cutting, while a 1:20 ratio suffices for most lathe work, drilling and screw machine work.

Oil are used for metal cutting where lubrication rather than cooling is essential for tool life and/or work quality.

WASTE STREAMS

The major wastes from machining operations are spoiled or contaminated metalworking fluids which are treated as hazardous wastes because of their oil content, as well as other chemical additives that some contain such as chlorine, sulfur and phosphorus compounds, phenols, creosols and alkalies. While fresh metalworking fluids contain varying degrees of oil depending on their function, "tramp" hydraulic and lubricating oils also find their way into the fluids during the course of operations. Spent metalworking fluids are at present either disposed of or recycled on- or off-site. Recycling typically consists of separating the oils through such methods as centrifuging and refining them or using them as fuel.

Solvent wastes resulting from cleaning of parts and equipment also comprise a sizable waste stream. This stream is examined in the "Metal Parts Cleaning and Stripping" section.

Many fabricated metal industries generate cuttings and other scrap metal. Scrap that is destined for reclamation is not regulated as hazardous waste. If metal chips from machining operations are mixed with hazardous metalworking fluid wastes, however, the waste stream is treated as hazardous.

While metalworking fluid purchases typically account for less than 0.5 percent of the cost of operating a machine tool (Schaffer 1978), the problems that contaminated and degraded fluids can cause can be expensive and troublesome. Proper coolant and cutting oil maintenance is necessary to prevent excessive machine tool downtime, corrosion, and rancidity problems.

Metalworking fluid rancidity, perhaps the most common problem, can affect productivity and operator morale. Rancidity odors are produced in contaminated fluids due to bacterial action. The odors are especially strong when machines are started up after periods of downtime. The odors are frequently unpleasant enough that the fluid must be changed.

Insufficient maintenance of cutting fluids, especially water-based fluids, can result in workpiece and machine tool corrosion. Many cutting fluids are relied upon to protect in-process parts from corrosion, but they will not offer this protection if they have deteriorated due to rancidity, or if they are not maintained at the recommended concentrations. Cutting fluids also must not be allowed to penetrate into gear boxes or into lubricating oil reservoirs, or internal damage to machines can result.

Contamination of water miscible metalworking fluids by "tramp" lubricating and hydraulic oils constitutes one of the major causes of fluid deterioration. The tramp oils interfere with the cooling effect of the fluids, promote bacterial growth, and contribute to oil mist and smoke in the shop environment. Tramp oils impair the filterability of metalworking fluids through both disposable and permanent media filters, and thus inhibit recycling. Tramp oils also contribute to unwanted residues on cutting tools and machine parts (Sluhan, W. A.)

The most serious problem caused by tramp oils is the promotion of bacterial growth, primarily *Pseudomonas oleovorans*, in the metalworking fluid. Such bacteria degrade lubricants, emulsifiers and corrosion inhibitors in the metalworking fluids, and liberate gases, acids and salts as byproducts of their growth (Sluhan, W.A.). Bacterial growth also interferes with the cooling effect of metalworking fluids.

The tramp oils that most contribute to bacteria growth are hydraulic oils (used in hydraulic assist systems), due to their high water miscibility compared to lubricating oils, and to the phosphorus antiwear compounds they contain, which catalyze microbe growth. Lubricating and machine ramp oils create less problems, because their lower miscibility causes them to float to the surface of the coolant.

Metal Parts Cleaning And Stripping

Cleaning and stripping operations are integral to numerous processes in industries involved with the manufacture of metal parts and equipment. Virtually all fabricated metal objects require some form of cleaning. Machined parts are cleaned with solvents; paint, oxidation and old plating is stripped from workpieces using caustics and abrasives; and workpieces in plating lines are cleaned several times using water, acids, caustics and detergents. Implementation of proper, environmentally sound cleaning and stripping techniques will markedly reduce toxicities and volumes of wastewater, as well as reducing process chemical requirements.

PROCESS DESCRIPTION

Five types of metal cleaning media are utilized by industry: 1) solvents (both halogenated and nonhalogenated); 2) alkaline cleaners; 3) acid cleaners; 4) nonchemical, abrasive materials; and 5) water. Alkaline and acid cleaners are usually referred to as aqueous cleaners. Mixtures of solvents and alkalines are frequently used. Mixtures where water-immiscible solvent is emulsified in water (often containing other additives) are termed emulsion cleaners.

Although metal parts cleaning is frequently thought of as a simple operation requiring little more than washing a part in solvent, many metal parts require sophisticated and rather complex sequences of cleaning steps. The design of a cleaning operation is generally dependent upon three interrelated factors:

- *The nature of the contamination.* It is important to know the composition as well as the history of contaminants on the metal's surface, in order to design the proper cleaning system and sequence of baths or other operations. Alkaline cleaners are often used to remove heavy soils and some solid oils, while caustics are good paint stripping agents. Acid cleaners and abrasives are employed to remove oxidation scale and rust. When parts have been contaminated with several materials, sequencing of cleaning operations can be important. For instance, a layer of oily contamination might be removed by an alkaline cleaner before abrasives are used to remove a rust layer.
- *The metal substrate.* The contaminant must be removed to the required degree without adversely affecting the metal substrate. Reactivity of different metals with alkaline and acids varies, and thus cleaners that are appropriate for one metal may not be for another.
- *The degree of cleanliness required.* The cleaning that a metal surface requires varies depending upon the particular surface treatment, plating or coating operations it will be subjected to. For instance, parts going to a cyanide-zinc plating bath do not usually need to first receive a high level of cleaning since cyanide-based plating solutions exhibit strong cleaning actions of their own. For a nickel plate to adhere to a metal surface, on the other hand, the surface must be extremely clean. Thus, thorough and rigorous cleaning operations are needed prior to the nickel plating.

It is frequently the case that no one cleaning operation can be specified as best based simply on reviewing the above factors. Several cleaning methods often appear appropriate, and only through experiment can the best one be selected.

Cleaners, except for abrasives, are normally contained in large open tanks, with the parts to be cleaned mounted on racks or in perforated horizontal barrels. The decision to use racks or barrels depends on the size and shape of the part as well as the type of coating it requires.

SOLVENT CLEANING

Solvents are the most widely used class of cleaners. They are employed for removing oil-based contaminants, in either cold cleaning, diphase cleaning, or vapor phase cleaning operations.

Cold cleaning generally employs unheated or slightly heated nonhalogenated solvents, and is the most common type of cleaning. The four categories of cold cleaning are: 1) wipe cleaning; 2) soak cleaning; 3) ultrasonic cleaning; and 4) steam gun stripping. Wipe cleaning consists of soaking a rag in solvent and wiping the metal part clean. Soak cleaning involves the immersion of the parts in a solvent tank. Ultrasonic cleaning is identical to soak cleaning, except that an ultrasonic unit is added to the tank, which provides a vigorous cleaning action throughout the tank. The main application of steam gun stripping is for paint removal from metal objects. A stripper made up of nonhalogenated solvents is fed into a steam line, through an adjustable valve, mixed with the steam and ejected at high speed from a nozzle.

Diphase cleaning systems are so named because they use both water and solvent phases for cleaning. Parts to be cleaned first pass through a water bath, then a solvent spray. Vapor phase cleaning, also called vapor degreasing, consists of a tank of halogenated solvent heated to its boiling point. Parts to be cleaned are placed in the vapor

zone above the liquid solvent. The vapor that condenses on the cooler part dissolves oil-based contamination and rinses the part clean. Since the potential exists for considerably greater air emissions from vapor phase cleaning than from cold cleaning tanks, special recovery equipment is installed, consisting of cooling jackets and/or finned coil condensers. By cooling the air above the vapor, a dense cool air blanket is formed which helps suppress vapor from escaping. The second unit, a finned coil condenser, is installed inside the tank and condenses any vapor that reaches it.

AQUEOUS (ALKALINE AND ACID) CLEANING AND STRIPPING

The cleaning action of aqueous cleaners relies mainly on displacement of soils rather than on their dissolution, as is the case with organic solvent. Since both alkaline and acid aqueous cleaners and strippers use the same equipment, they are discussed together. Alkaline cleaning solutions contain builders (sodium salts of phosphates, carbonates, silicates, and hydroxides) and surfactants (detergents and soaps). Other additives may include anti-oxidants and stabilizers as well as small amount of solvents. Alkaline cleaners and strippers are employed to remove soil from metal parts, as well as old plating and paint. Acidic cleaning solutions may contain mineral acids (nitric, sulfuric and hydrochloric), organic acids (sulfamic, acetic, oxalic or cresylic), detergents, chelating agents and occasionally small amount of solvents. Acid cleaners remove rust, scale, and "smut", which is formed from electrocleaning. Very strong alkaline cleaners containing cyanide and cleaning agents have recently been formulated to replace acid cleaners. No matter what type of aqueous cleaner is used, soak tanks similar to those used for solvents are the most common cleaning method employed. Some aqueous cleaners, however, are used in electrochemical cleaning, in which the workpiece is connected to a source of current. In direct current electrochemical cleaning, the workpiece is attached to the cathode, causing hydrogen gas to be formed at the part's surface that provides a scrubbing action. Smut formation (the plating of metal contaminants in the solution onto the workpiece) does sometimes occur, however, as well as hydrogen embrittlement of the metal. These disadvantages are avoided in reverse current cleaning, or electropolishing, in which the workpiece is attached to the anode. Metal substrate is dissolved electrolytically, liberating the surface contaminant.

ABRASIVE CLEANING AND STRIPPING

Abrasive cleaners are designed for removing rust, oxides and burrs, old plating and paint, and to create a smooth surface. Typical abrasives are aluminum oxide or silicon carbide mixed with an oil or water based binder. The abrasive-binder mixture is applied to a buffing wheel made from an absorbent material such as cloth. The metal part is held against the spinning wheel. Vibratory finishing is another method of abrasive cleaning in which a load of metal parts is immersed in a vibrating tank containing abrasive material and water. Similar cleaning methods employ tumbling barrels and centrifugal barrel finishing.

WATER CLEANING

Water cleaning is an integral part of every parts cleaning process. Most of the cleaning operations mentioned above require that a water wash be performed before and after each operation. The washing is generally done either in a soak tank, or using a spray unit. Because rinse water generally comprises the largest waste stream in metal fabrication processes, measures for reducing the amount of water required (such as extending water bath life by preventing its contamination by other cleaning media) are very important in reducing the overall volume of wastes.

WASTE STREAMS

The primary wastes associated with metal parts cleaning are listed in Table 1, along with their sources. The composition of the waste depends on the cleaning media used, type of substrate, and the type of soil removed (oils, greases, waxes, metallic particles, oxides, etc.). If a facility has a wastewater treatment system, primary rinse water, alkaline and acid cleaning solutions can be mixed together (one acts to neutralize the other) and then treated.

Secondary rinse water (if secondary rinse is employed) is usually used to replace discarded primary rinse water and/or used as a makeup for cleaning solutions. For facilities using small amounts of cleaner, the tendency is to drum the material for disposal. Solvent waste can be sent to an off-site recycler or recycled on-site using distillation equipment.

Metal Surface Treatment And Plating Operations

Metal surface treatment and plating are practiced by most industries engaged in forming and finishing metal products, and involve the alteration of the metal workpiece's surface properties, in order to increase corrosion or abrasion resistance, alter appearance, or in some other way enhance the utility of the product. Plating and surface treatment operations are typically batch operations, in which metal objects are dipped into and then removed from baths containing various reagents for achieving the required surface condition. The processes involve moving the object to be coated (the workpiece) through a series of baths designed to produce the desired end product. Workpieces can be carried on racks or in barrels. Large workpieces are mounted on racks that carry the parts from bath to bath. A set of small parts can be contained in barrels that rotate in the plating bath.

Table 1. Metal Parts Cleaning Wastes

No.	Waste Description	Process Orgin	Composition
1.	Abrasive	Removal of rust, scale polishing of metal	Aluminum oxide, silica metal, water, grease
2.	Solvents	Removal of oil-based soils	Halogenated and non-halogenated solvents, oil-based contaminants
3.	Alkalines	Removal of organic soils, descaling	Alkaline salts, additives, organic soils, water
4.	Acids	Removal of scale, smut	Acids, additives, dissolved metal salt, water
5.	Rinse water	Removal of previous cleaning material	Water with traces of cleaners and additives

PROCESS DESCRIPTION

Plating operations can be categorized as electroplating and electroless plating processes. Surface treatment includes chemical and electrochemical conversion, case hardening, metallic coating, and chemical coating. Most metal surface treatment and plating processes have three basic steps: surface cleaning or preparation (which was examined in the previous action); the actual modification of the surface, involving some change in its properties (e.g. case hardening, or the application of a metal layer); and rinsing or other workpiece finishing operations.

Chemical and Electrochemical Conversion

Chemical and electrochemical conversion treatments are designed to deposit a coating on a metal surface that performs a corrosion protection and/or decorative function, and in some instances is a preparation for painting. Processes include phosphating, chromating, anodizing, passivation, and metal coloring. Phosphating treatments provide a coating of insoluble metal phosphate crystals that adhere strongly to the base metal. The coatings provide some corrosion resistance, but their main function, due to their absorptivity, is as a base for the adhesion of paints, lacquers, and oils to the metal surface. Chromate coatings are applied to minimize rust formation and to guarantee paint adhesion. Chromating baths' ingredients include hexavalent chromium, one or two mineral acids (e.g. sulfuric or nitric), and often several organic or inorganic activating compounds.

Anodizing employs electrochemical means to develop a surface oxide film on the workpiece, enhancing its corrosion resistance. Passivation is a process by which protective films are formed through immersion in an acid solution. In stainless steel passivation, embedded ion particles are dissolved and a thin oxide coat is formed by immersion in nitric acid, sometimes containing sodium dichromate.

Case Hardening

Case hardening produces a hard surface (the case) over a metal core that remains relatively soft. The case is wear-resistant and durable, while the core is left strong and ductile. Case hardening methodologies include carburizing, carbonitriding, nitriding, microcasing, and hardening using localized heating and quenching operations.

Carburizing, the most widely used case hardening operation, involves diffusion of carbon into a steel surface at temperatures of 845° to 955°C, producing a hard case in the high carbon areas. Nitriding processes diffuse nascent nitrogen into a steel surface to produce case-hardening. Nitriding is accomplished using either a nitrogenous gas, (usually ammonia), or a liquid salt bath, typically consisting of 60 to 70 percent sodium salts, mainly sodium cyanide, and 30 to 40 percent potassium salts, mainly potassium cyanide. Carbonitriding and cyaniding involves the diffusion of both carbon and nitrogen simultaneously into a steel surface.

Applied energy methods are those that generate a case through localized heat and quenching, rather than through use of chemicals. Very rapid heat application results in surface hardening with little heat conducted inward. Since no carbon or nitrogen is diffused into the workpiece, it is the existing carbon content of the ferrous metal that

determines hardness response. Heating can be accomplished through electromagnetic induction, high temperature flames or high velocity combustion product gases.

Metallic Coatings

Metallic coatings provide a layer that changes the surface properties of the workpiece to those of the metal being applied. The workpiece becomes a composite material with properties generally not achievable by either material singly. The coating's function is usually as a durable, corrosion resistant protective layer, while the core material provides the load-bearing function. Metallic coatings as defined here refer to diffusion coatings (in which the base metal is brought into contact with the coating metal at elevated temperatures allowing lattice interdiffusion of the two materials); spraying techniques; cladding (application using mechanical techniques); vapor deposition and vacuum coating.

Hot dipping is a diffusion process that involves partial or complete immersion of the workpiece in a molten metal bath. Common coating materials include aluminum, coated lead, tin, zinc, and combinations of the above. The coating metal in a cementation diffusion process is applied in powdered form at a high temperature (800 to 1100°C), in a mixture with inert particles such as alumina or sand, and a halide activator. The main applications of sprayed diffusion coatings are for workpieces difficult to coat by other means due to their size and shape, or that are damageable by the high temperature heating required of other methods. Vapor deposition and vacuum coating produce high quality, pure metallic layers, and can sometimes be used in place of plating processes. A layer of metal cladding can be bonded to the workpiece using high pressure welding or casting techniques. Cladding can offer an alternative to plating in some situations.

Electroplating

Electroplating is achieved by passing an electric current through a solution containing dissolved metal ions as well as the metal object to be plated. The metal object acts as a cathode in an electrochemical cell, attracting metal ions from the solution. Ferrous and nonferrous metal objects are typically electroplated with aluminum, brass, bronze, cadmium, chromium, copper, iron, lead, nickel, tin, and zinc, as well as precious metals such as gold, platinum, and silver. Common electroplating bath solutions are listed in Table 2.

The sequence of unit operations in an electroplating operation is very similar when either racks or barrels are used to carry parts. A typical sequence involves various types of cleaning steps, stripping of old plating or paint, the actual electroplating steps, and rinsing steps between and after each of the above operations.

Table 2. Common Electroplating Bath Compositions

Electroplating Bath Name	Composition
Brass and Bronze	Copper cyanide Zinc cyanide Sodium cyanide Sodium carbonate Ammonia Rochelle salt
Cadmium Cyanide	Cadmium cyanide Cadmium oxide Sodium cyanide Sodium hydroxide
Cadmium Fluoroborate	Cadmium fluoroborate Fluoroboric acid Boric acid Ammonium fluoroborate Licorice
Copper Cyanide	Copper cyanide Sodium cyanide Sodium carbonate Sodium hydroxide Rochelle salt
Copper Fluoroborate	Copper fluoroborate Fluoroboric acid
Acid Copper Sulfate	Copper sulfate Sulfuric acid
Copper Pyrophosphate	Copper pyrophosphate Potassium hydroxide Ammonia
Fluoride-Modified Copper Cyanide	Copper cyanide Potassium cyanide Potassium fluoride
Chromium	Chromic acid Sulfuric acid
Chromium with Fluoride Catalyst	Chromic acid Sulfate Fluoride

Electroless plating uses similar steps, but involves the deposition of metal on a metallic or non-metallic surface without the use of external electrical energy.

WASTE STREAMS

Common plating and surface treatment process wastes are listed in Table 3. Two of the waste streams, *spent alkaline cleaning solutions* and *spent acid cleaning solutions*, are generated by periodic replacement of contaminated solutions. *Rinse waters* are generated from overflow of rinse tanks and contamination by drag-out from cleaning baths. Waste removed from plating tanks by the continuous filtering of the baths results in *filter sludges*.

Table 3. Process Wastes

Waste Description	Process Origin	Composition
Spent process solutions	Plating and chemical conversion	See Table 2.2
Filter sludges	Plating and chemical conversion	Silica, silicides, carbides, ash, plating bath consituents
Quench oils and quench oil tank cleanup wastes	Case hardening	Oils, metal fines, combustion products
Spent salt bath	Carburizing, nitriding, cyaniding	Sodium cyanide and cyanate. Potassium cyanide and cyanate.
Wastewater treatment sludge	Wastewater treatment	Metal hydroxides, sulfides, carbonates
Vent scrubber wastes	Vent scrubbing	Similar to process solution composition
Ion exchange resin reagents	Demineralization of process water	Brine, HCl, NaOH

Wastes produced at a particular facility will be similar to those listed, but their precise composition will depend on the specific process. Some or all of the waste types listed may be combined into a single stream before treatment and disposal. It is common to combine concentrated cyanide wastes from plating and cleaning solutions, for instance, with filter sludges. These are generally kept separate, however, from acidic wastes and from the dilute cyanide solutions.

On a volume basis, contaminated rinsewater accounts for the majority of plating process waste. As shown in the previous sections, plating processes can involve many rinsing steps. Rinsewater is used to wash off the drag-out from a workpiece after it is removed from a bath. *Drag-out* refers to the excess solution that adheres to the workpiece surface and gets carried out of the solution bath upon withdrawal of the workpiece from the bath. In general, the use of small part barrels in the plating process (barrel plating) produces more drag-out than rack plating. This is because a barrel carries in it more plating solution upon withdrawal from the bath than a rack does, and because drainage of the drag-out back into the bath is more difficult with barrels. If the drag-out from one bath is carried into the next bath in the sequence due to incomplete rinsing, it is referred to as "drag-in," and is considered a contaminant in the latter bath.

Spent cleaning and plating solutions are another source of plating wastes. Several types of cleaning solutions are used to prepare a metal surface for electroplating. Stripping wastes are a special type of cleaning waste. They result from the stripping off of the old plated deposit prior to the deposition of a new metal plate. Cleaning solutions may be acidic or basic, and may contain organics. Heavy metals are usually not present, although some cleaning solutions contain cyanide. Spent plating solutions contain high concentrations of metals. These solutions are not regularly discarded like cleaning solutions, but may require purging if impurities build up.

Wastes produced from spills and leaks are usually present to some extent in an electroplating process. Water is used to wash away floor spills, and the resulting wastewater contains all of the contaminants present in the original solutions. Wastewater is also produced from the wet scrubbing of ventilation exhaust air.

Wastewater produced in an electroplating process may contain a variety of heavy metals and cyanide. The metals are typically removed by adding lime or other precipitating agents, and precipitated under alkaline pH. The resulting metal hydroxide precipitate forms a dilute sludge, which is thickened and then disposed of by landfilling.

Paint Application

The application of paint is practiced within most fabricated metal industries. Surface coatings are used wherever it is desired to provide decoration, protection, and/or safety marking to a product or item. Most paint coatings for fabricated metal products are solvent based

although many shops are replacing these with water based materials.

PROCESS DESCRIPTION

Before a product coating can be applied to a surface, the surface must be free from contamination. As described above, many different types of abrasives, alkalines, acids, and solvents, as well as water, are used by industry to clean metal surfaces. Once a part is cleaned, surface treatment such as phosphate coating can be applied if desired. The purpose of surface treatment is to condition or prepare the surface so that the paint forms a better bond with the metal surface.

After the item has been cleaned and treated, paint can be applied. Depending on the size, shape, complexity, and quantity of items to be painted, different application methods can be employed. When it is desired to paint a large number of very small items, the most commonly used methods are *tumbling, barreling, or centrifuging*. For all three methods, the parts are placed inside a barrel, solvent-based paint is poured onto the items, and the barrel is then rotated. After a short time and at the correct point of tackiness, the parts are transferred to an oven in a wire basket. While paint consumption using these methods is very small, the empirical nature of the operation requires that the operator be highly experienced to achieve reliable results.

For cylindrical items, a commonly used method is *dipping*. Here the paint is held in a large tank and the object to be painted is slowly lowered into the tank and then withdrawn. Many complex items can be dip painted provided that the drainage points (the places where the excess paint drips off), can be located where they are not noticeable.

Flow coating is often employed for items that would be difficult to dip because of their size or shape, or as a means of avoiding the installation and operation of large dip tanks. A flow coating system operates by using high pressure sprays to flood the item with solvent-based paint. After spraying, the item is allowed to drain and the excess paint is recirculated. Since a considerable amount of bubbling occurs due to spraying, the item is then passed through a solvent chamber where the solvent vapors allow the paint to reflow. Following this operation, the item is then oven-dried. The main disadvantage of flow coating is high solvent loss, which can be three times as large as for dipping and twice as great as for spraying.

For relatively flat items of large area, *roller coating* and *curtain coating* machines are used. Roller coating is used extensively by the canning industry for painting flat metal sheets that are then fabricated into cans. It is also used for spreading or applying glue to wood in the manufacturing of plywood. A roller coating machine operates by metering paint or coating material onto a roller and then transporting the item past the roller by means of a conveyor belt. A curtain coating machine consists of a pressurized container along the bottom of which is an adjustable slit that allows the coating to flow and form a vertical curtain. A conveyor belt is placed on each side of the curtain so that work items are passed through the curtain and coated without the conveyor belts being coated.

While all of the above-mentioned methods have found widespread acceptance by industry, the most widely used method for applying paint is still the spray gun. A spray gun operates by using compressed air, to atomize the paint and produce a fan or circular cone spray pattern. Many installations are automated so that a fixed gun is turned on when an object passes in front of it. In its simplest use, the gun is hand-held and the object remains stationary. Some of the variations on spray gun painting are airless spray guns and electrostatic spray guns. Airless spray guns force the paint out at high pressure so that air is not require for atomization. By eliminating the use of compressed air, operating costs are lower, spray mists are not produced, and expensive exhaust systems are not required. Electrostatic spray units are designed so that the atomized paint leaving the gun has a positive charge. This positive charge causes the paint to be attracted to the object which is connected to ground. Since more of the paint reaches its target (thereby reducing overspray), less waste is generated.

Following the application of paint, the item is passed through a drying or curing oven. The curing methods employed, infrared or ultraviolet, will depend on the type of paints being used. Once dried, the items are sent to inspection and final packaging or assembly. If a part fails inspection because of a bad finish, it is usually reworked by stripping off the paint and returning it to the cleaning operation.

WASTE STREAMS

The primary wastes associated with product coating applications consist of empty paint containers, spent cleaning solutions, paint overspray (including paint collected by air pollution control equipment), spent stripping solutions, and equipment cleaning wastes. Waste minimization methods for stripping and cleaning are examined under the "Parts Cleaning" heading in Section Three; source reduction and recycling methods for the other waste streams are examined under "Paint Wastes" in Section Three.

United States
Environmental Protection
Agency

Office of Research and
Development
Washington DC 20460

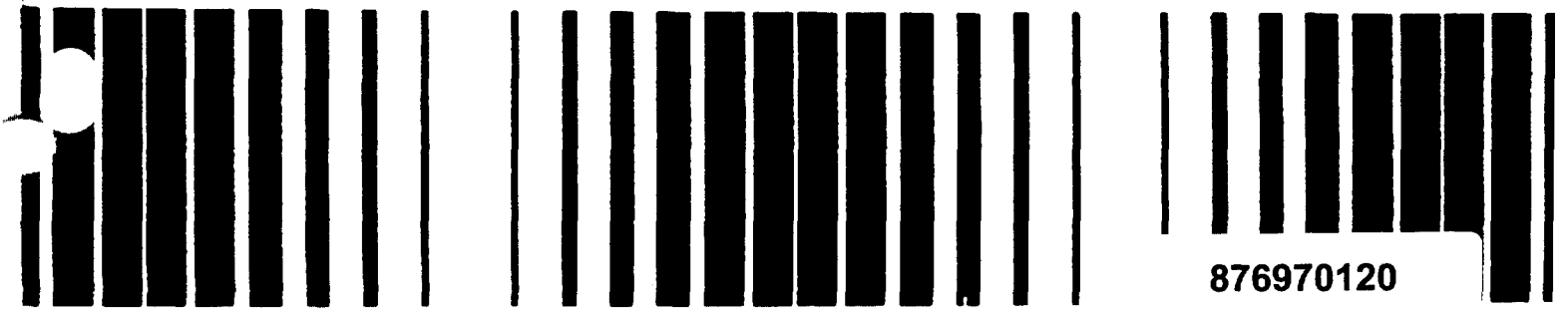
EPA/625/R-92/011
October 1992

Technology Transfer

EPA

Guides to Pollution Prevention

The Metal Finishing Industry



FOREWORD

This guide provides an overview of the major metal finishing processes and operations that generate waste and presents options for minimizing waste generation through source reduction and recycling. A wide variety of processes are used in the metal finishing industry, including physical, chemical, and electrochemical processes. Metal finishing processes generate various waste streams, including contaminated plating baths, spent process baths, cleaners, rinse water, miscellaneous solid waste, solvents, and air emissions.

Reducing the generation of this waste at the source or recycling the wastes on or off site will benefit the metal finishing industry by reducing raw material use, reducing disposal costs, and lowering the liabilities associated with waste disposal.

CONTENTS

SECTION 2
METAL FINISHING INDUSTRY PROFILE

Industry Description

The metal finishing industry uses a wide variety of materials and processes to clean, etch, and plate metallic and nonmetallic surfaces to provide desired surface properties. The materials include solvents and surfactants for cleaning, acids and bases for etching, and solutions of metal salts and other compounds to plate a finish onto a substrate. Physical, chemical, and electrochemical processes are all used to finish metal workpieces. The processes may simply polish the surface to provide a bright appearance or apply another metal to change the surface properties or appearance.

Process Description

Physical processes used in the metal finishing industry—such as buffing, abrasive blasting, grinding, tumbling, and polishing—do not generate as much waste as chemical and electrochemical processes. Physical processes involve the use of a solid material (or abrasive) to change the surface characteristics of a workpiece, and the waste generated contains the abrasive and the material removed from the surface. The use of sand for paint stripping operations is an example of a physical finishing process.

The industry also uses chemical processes (degreasing, cleaning, pickling, etching, coating, and electroless plating) and electrochemical processes (plating, electrocleaning, electropolishing, and anodizing). These operations are typically performed in baths (tanks) and are then followed by a rinsing cycle. Figure 2 illustrates a typical chemical or electrochemical process step in which the workpiece enters the process bath containing process chemicals that are carried to the rinse water (drag-out). When the workpiece is transferred from the bath to the rinse, process solution will fall to the floor unless it is captured and returned to the process bath. In such cases, waste can be minimized by containing the process solution and returning it to the bath, which reduces the rinse flow and extends the life of the bath.

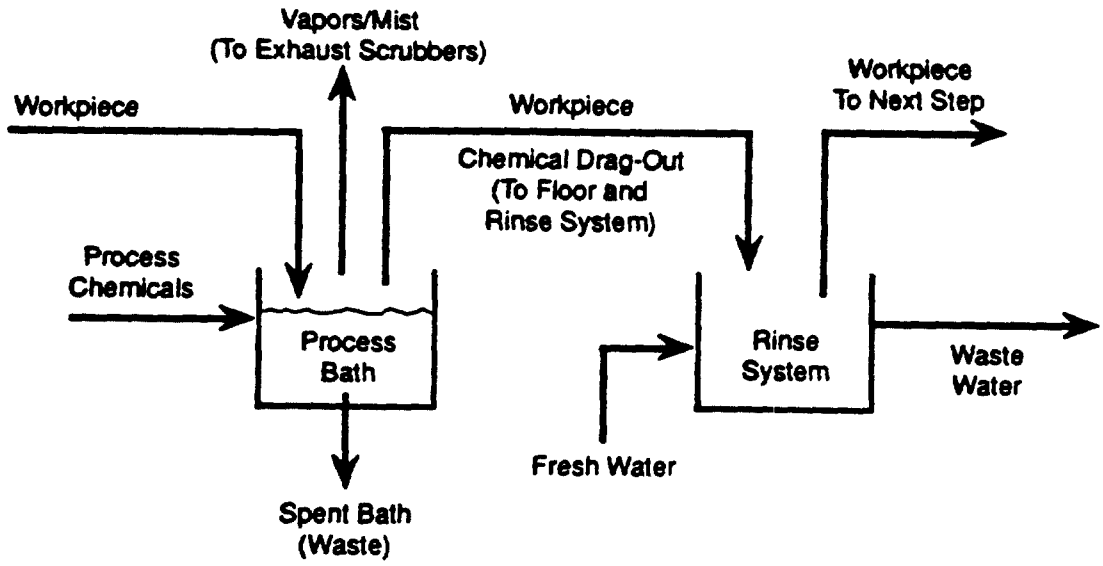


Figure 2. Typical Metal Finishing Process Step

Waste Description

Wastewater, solid waste, and air emissions are generated by the metal finishing process. Wastewater includes:

- Industrial wastewater—rinse water, cooling water, steam condensate, boiler blowdown, wash water, and exhaust scrubber solution
- Spent plating baths—contaminated or spent electroplating or electroless plating baths
- Spent process baths—etchants and cleaners that are contaminated or spent
- Strip and pickle baths—nitric, sulfuric, hydrochloric, and hydrofluoric acids used to strip metals from workpiece racks or parts
- Exhaust/scrubber solutions—solutions collected in exhaust and air emission control devices.

Solid waste includes:

- Industrial wastewater treatment sludge—sludge containing metals such as cadmium, copper, chromium, nickel, tin, and zinc
- Miscellaneous solid wastes—absorbants, filters, empty containers, aisle grates, and abrasive blasting residues
- Solvents—contaminated solvents used for degreasing.

Air emissions include vapors from degreasing and solvent cleaning and mists from chromium plating operations.

The primary source of waste in the metal finishing industry occurs in the rinsing operation. Generally, rinse water waste contains low concentrations of process chemicals carried with the workpiece into the rinse (drag-out). Typical rinse water treatment produces a metal hydroxide sludge that can be a hazardous waste. Characterizing the drag-out carried into the rinse water from the process bath requires the chemical concentration and volume to be determined. The chemical concentration of the drag-out is the same as the chemical concentration of the process bath; drag-out volume can be determined by measuring the chemical concentration of a static rinse tank before and after a loaded workpiece rack is rinsed. The equation for calculating drag-out is as follows:

$$V_d = \frac{(C_r)(V_r)}{C_p}$$

where V_d = volume of drag-out loss
V_r = volume of water in the rinse tank
C_p = concentration of chemicals in the process bath
C_r = concentration of chemicals in the rinse water.

After use, spent baths may be containerized for treatment and disposal or recycled. To determine the potential for modifying the bath's operating parameters or recycling or reusing the bath, its chemical and physical characteristics must first be quantified. The characteristics establish the potential for the baths reuse or value to a recycler.

Additional potential waste hazards in the metal finishing industry include vapors and mists emitted from process baths, spills, and samples. Vapors and mists are usually controlled by exhaust systems that must be equipped with mist collection and scrubbing systems to meet air emission regulations. Spills, if they are common, can contribute significantly to the volume of waste. Documenting their occurrence will provide valuable historical information for identifying maintenance or operational changes necessary to reduce their frequency. Samples of plating solutions provided by vendors that are not intended for use also contribute to the waste generated by the metal finishing industry. These samples often accumulate without concern for violating any waste storage time requirements. However, these samples must eventually be returned or disposed of. Outdated chemicals are additional examples of waste not typically attributed directly to the production process. Additional processing waste includes the filter elements from filtration units, empty process solution containers, abrasive blasting residues, and waste from housekeeping activities. Table 1 is a summary of the waste generated by the metal finishing industry.

Table 1. Summary Table of Metal Finishing Industry Waste

Waste	Potential Hazards	Waste Stream	Process
Alkali (hydroxide)	Corrosivity	Wastewater	Cleaning, etching
Acid (nitric, sulfuric, hydrochloric, hydrofluoric)	Corrosivity	Wastewater	Cleaning, pickling, etching, bright dipping
Surfactants	Aquatic toxicity	Wastewater	Cleaning
Oil and Grease	Aquatic toxicity	Wastewater, spent solvent	Cleaning
Cadmium, Zinc, Nickel, Copper, Other Metals	Toxicity	Plating bath, drag-out, rinse water, spent filters, sludge	Plating
Perchloroethylene, Trichloroethylene, Other Solvents	Inhalation, dermal	Spent solvent (liquid or sludge), air emissions	Cleaning
Cyanide	Toxicity	Plating bath, drag-out, rinse water, other wastewater	Plating, tumbling, stripping, heat treating, desmutting
Chromates	Toxicity	Plating bath, drag-out, rinse water, sludge, other wastewater, mist	Plating, chromating, etching
Water	—	Rinse water, drag-out, process bath, air emission (evaporation), cooling water, boiler blowdown	Various

E

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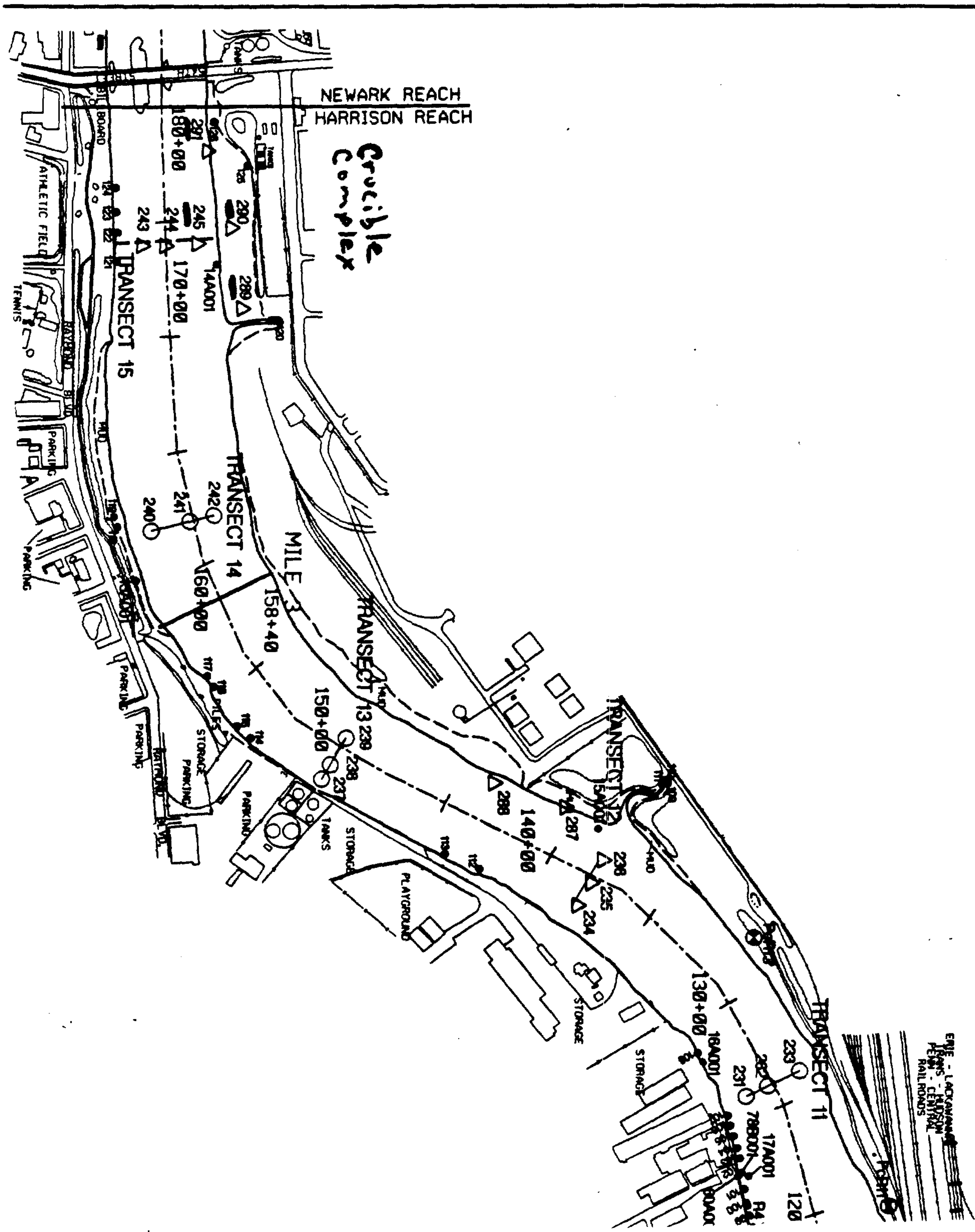
COLTEC INDUSTRIES, INC.

TAB E

Data from sediments adjacent to the facility indicating that the same types of substances known to be at the facility have been detected at significant levels in Passaic River sediments near the facility.


NEWARK REACH
HARRISON REACH
Crucible Complex
ATHLETIC FIELD
TENNIS
PARKING
TRANSECT 15
TRANSECT 14
TRANSECT 13
TRANSECT 12
TRANSECT 11
MILE 3
180+00
170+00
160+00
158+40
150+00
140+00
130+00
120
STORAGE
TANKS
PLAYGROUND
ERIE - LACKAWANNA
TRANS - HUDSON
PENN - CENTRAL
RAILROADS

876970128

CRUCI STEEL
"Mud Flats", Transect 15, and Transect 14
VOAs, TPHC, and PCBs

		MUDFLATS						TRANSECT 15						TRANSECT 14					
Contaminant	Site Use	Core 289	Dates	Core 290	Dates	Core 291	Dates	Core 245	Dates	Core 244	Dates	Core 243	Dates	Core 242	Dates	Core 241	Dates	Core 240	Dates
Chloroform	3	ND	1995-1961	ND	1995-1961	ND	1995-1980	ND	1995-1990	ND	1995-1983	ND	1995-1987	ND	1995-1991	ND	1995-1989	ND	1995-1980
(ug/Kg)	soil	ND	1961-1928	ND	1961-1928	ND	1980-1966	ND	1990-1985	ND	1983-1972	ND	1987-1979	ND	1991-1984	ND	1989-1973	ND	1980-1980
		ND	1928-1895	ND	1928-1895	ND	1966-1952	ND	1985-1976	ND	1972-1961	ND	1979-1971	ND	1984-1977	ND	1973-1968	ND	1980-1966
		ND	1895-1861	ND	1895-1861	ND	1952-1937	ND	1976-1963	ND	1961-1950	ND	1971-1964	ND	1977-1959	ND	1968-1952	ND	1966-1952
		ND	1861-1828	ND	1861-1828	ND	1937-1923	ND	1967-1958	ND	1950-1939	ND	1964-1956	ND	1970-1952	ND	1958-1947	ND	1952-1952
		ND	1828-1795	ND	1828-1795	ND	1923-1909	ND	1963-1954	ND	1939-1928	ND	1956-1948	ND	1959-1945	ND	1952-1942	ND	1952-1937
								ND	1954-1945					ND	1945-1934	ND	1942-1931		
Trichloroethylene	50	ND	1995-1961	ND	1995-1961	ND	1995-1980	ND	1995-1990	ND	1995-1983	ND	1995-1987	ND	1995-1991	ND	1995-1989	ND	1995-1980
(ug/Kg)	soil	ND	1961-1928	ND	1961-1928	ND	1980-1966	ND	1990-1985	ND	1983-1972	ND	1987-1979	ND	1991-1984	ND	1989-1973	ND	1980-1980
		ND	1928-1895	ND	1928-1895	ND	1966-1952	ND	1985-1976	ND	1972-1961	ND	1979-1971	ND	1984-1977	ND	1973-1968	ND	1980-1966
		ND	1895-1861	ND	1895-1861	ND	1952-1937	ND	1976-1963	ND	1961-1950	ND	1971-1964	ND	1977-1959	ND	1968-1952	ND	1966-1952
		ND	1861-1828	ND	1861-1828	ND	1937-1923	ND	1967-1958	ND	1950-1939	ND	1964-1956	ND	1970-1952	ND	1958-1947	ND	1952-1952
		ND	1828-1795	ND	1828-1795	ND	1923-1909	ND	1963-1954	ND	1939-1928	ND	1956-1948	ND	1959-1945	ND	1952-1942	ND	1952-1937
								ND	1954-1945					ND	1945-1934	ND	1942-1931		
Aroclor 1254	3,800	1320	1995-1961	1860	1995-1961	ND	1995-1980	192	1995-1990	2070	1995-1983	944	1995-1987	ND	1995-1991	R	1995-1989	2730	1995-1980
(ug/Kg)	soil	2300	1961-1928	1900	1961-1928	ND	1980-1966	ND	1990-1985	964	1983-1972	ND	1987-1979	ND	1991-1984	ND	1989-1973	2630	1980-1980
		R	1928-1895	ND	1928-1895	ND	1966-1952	ND	1985-1976	R	1972-1961	ND	1979-1971	ND	1984-1977	1320	1973-1968	1920	1980-1966
mean: 1,575		ND	1895-1861	ND	1895-1861	ND	1952-1937	ND	1976-1963	R	1961-1950	5330	1971-1964	ND	1977-1959	2130	1968-1952	ND	1966-1952
high: 18,100		ND	1861-1828	ND	1861-1828	ND	1937-1923	2760	1967-1958	R	1950-1939	3010	1964-1956	ND	1970-1952	R	1958-1947	R	1952-1952
		ND	1828-1795	ND	1828-1795	ND	1923-1909	ND	1963-1954	ND	1939-1928	ND	1956-1948	ND	1959-1945	R	1952-1942	ND	1952-1937
top 20								ND	1954-1945					ND	1945-1934	ND	1942-1931		
above mean																			
TPHC	4200000	246000	1995-1961	468000	1995-1961	343000	1995-1980	77900	1995-1990	875000	1995-1983	NA	1995-1987	168000	1995-1991	136000	1995-1989	566000	1995-1980
(ug/Kg)	soil	351000	1961-1928	471000	1961-1928	593000	1980-1966	315000	1990-1985	662000	1983-1972	NA	1987-1979	300000	1991-1984	307000	1989-1973	701000	1980-1980
		1250000	1928-1895	136000	1928-1895	752000	1966-1952	520000	1985-1976	324000	1972-1961	NA	1979-1971	1250000	1984-1977	858000	1973-1968	934000	1980-1966
		ND	1895-1861	ND	1895-1861	533000	1952-1937	690000	1976-1963	651000	1961-1950	NA	1971-1964	822000	1977-1959	933000	1968-1952	653000	1966-1952
		ND	1861-1828	ND	1861-1828	551000	1937-1923	689000	1967-1958	513000	1950-1939	NA	1964-1956	909000	1970-1952	685000	1958-1947	1390000	1952-1952
		ND	1828-1795	NA	1828-1795	34100	1923-1909	540000	1963-1954	280000	1939-1928	NA	1956-1948	1030000	1959-1945	703000	1952-1942	433000	1952-1937
								496000	1954-1945					473000	1945-1934	796000	1942-1931		

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ND = Non detect
NA = Not Analyzed
R = Data Rejected

CRUCI EEL
"Mud Flats", Transec .5, and Transect 14
PAHs

Contaminant		MUDFLATS						TRANSECT 15						TRANSECT 14					
	Site Use	Core 289	Dates	Core 290	Dates	Core 291	Dates	Core 245	Dates	Core 244	Dates	Core 243	Dates	Core 242	Dates	Core 241	Dates	Core 240	Dates
Acenaphthene	900	ND	1995-1961	1400	1995-1961	930	1995-1980	ND	1995-1990	18000	1995-1983	ND	1995-1987	ND	1995-1991	ND	1995-1989	ND	1995-1980
ppb	soil	ND	1961-1928	760	1961-1928	2600	1980-1966	ND	1990-1985	1500	1983-1972	ND	1987-1979	ND	1991-1984	ND	1989-1973	ND	1980-1980
mean: 7317		15000	1928-1895	1100	1928-1895	1900	1966-1952	2600	1985-1976	1700	1972-1961	ND	1979-1971	ND	1984-1977	ND	1973-1968	ND	1980-1966
high: 420000		6600	1895-1861	ND	1895-1861	1100	1952-1937	820	1976-1963	930	1961-1950	ND	1971-1964	820	1977-1959	ND	1968-1952	850	1966-1952
top 20		3000	1861-1828	ND	1861-1828	3400	1937-1923	770	1967-1958	1800	1950-1939	ND	1964-1956	740	1970-1952	1100	1958-1947	920	1952-1952
above mean		800	1828-1795	ND	1828-1795	ND	1923-1909	840	1963-1954	3500	1939-1928	ND	1956-1948	910	1959-1945	2500	1952-1942	1800	1952-1937
								3100	1954-1945					1800	1945-1934	9700	1942-1931		
Acenaphthylene	400	ND	1995-1961	ND	1995-1961	ND	1995-1980	ND	1995-1990	1900	1995-1983	ND	1995-1987	ND	1995-1991	ND	1995-1989	ND	1995-1980
ppb	soil	ND	1961-1928	ND	1961-1928	ND	1980-1966	ND	1990-1985	ND	1983-1972	ND	1987-1979	ND	1991-1984	ND	1989-1973	ND	1980-1980
mean: 2036		2700	1928-1895	ND	1928-1895	ND	1966-1952	ND	1985-1976	1100	1972-1961	ND	1979-1971	ND	1984-1977	ND	1973-1968	ND	1980-1966
high: 17000		ND	1895-1861	ND	1895-1861	ND	1952-1937	ND	1976-1963	ND	1961-1950	ND	1971-1964	ND	1977-1959	ND	1968-1952	ND	1966-1952
top 20		ND	1861-1828	ND	1861-1828	ND	1937-1923	ND	1967-1958	1100	1950-1939	ND	1964-1956	840	1970-1952	640	1958-1947	ND	1952-1952
above mean		ND	1828-1795	ND	1828-1795	ND	1923-1909	ND	1963-1954	940	1939-1928	ND	1956-1948	820	1959-1945	610	1952-1942	ND	1952-1937
								ND	1954-1945					640	1945-1934	590	1942-1931		
Anthracene	1600	ND	1995-1961	2300	1995-1961	1200	1995-1980	ND	1995-1990	8400	1995-1983	ND	1995-1987	ND	1995-1991	ND	1995-1989	ND	1995-1980
ppb	soil	ND	1961-1928	1400	1961-1928	2100	1980-1966	ND	1990-1985	1500	1983-1972	ND	1987-1979	ND	1991-1984	880	1989-1973	1000	1980-1980
mean: 3821		14000	1928-1895	2400	1928-1895	1800	1966-1952	1600	1985-1976	3000	1972-1961	ND	1979-1971	1100	1984-1977	1100	1973-1968	7400	1980-1966
high: 230000		ND	1895-1861	ND	1895-1861	1300	1952-1937	3000	1976-1963	1100	1961-1950	1200	1971-1964	1900	1977-1959	2000	1968-1952	2000	1966-1952
top 20		ND	1861-1828	ND	1861-1828	2700	1937-1923	2300	1967-1958	2700	1950-1939	ND	1964-1956	1700	1970-1952	1900	1958-1947	1900	1952-1952
above mean		ND	1828-1795	ND	1828-1795	ND	1923-1909	2800	1963-1954	2500	1939-1928	780	1956-1948	1300	1959-1945	2600	1952-1942	2400	1952-1937
								3100	1954-1945					2300	1945-1934	7900	1942-1931		
Benzo(a)anthracene	4000	1100	1995-1961	3300	1995-1961	4300	1995-1980	1300	1995-1990	10000	1995-1983	ND	1995-1987	1200	1995-1991	2500	1995-1989	1800	1995-1980
ppb	soil	1900	1961-1928	3200	1961-1928	5500	1980-1966	1800	1990-1985	2200	1983-1972	1100	1987-1979	970	1991-1984	2700	1989-1973	1900	1980-1980
mean: 3546		14000	1928-1895	8000	1928-1895	3400	1966-1952	2200	1985-1976	5400	1972-1961	1600	1979-1971	2000	1984-1977	2200	1973-1968	1800	1980-1966
high: 150000		ND	1895-1861	ND	1895-1861	3600	1952-1937	3100	1976-1963	2300	1961-1950	1100	1971-1964	3400	1977-1959	3300	1968-1952	3800	1966-1952
top 20		ND	1861-1828	ND	1861-1828	4000	1937-1923	2700	1967-1958	4400	1950-1939	1400	1964-1956	2900	1970-1952	3700	1958-1947	3900	1952-1952
above mean		ND	1828-1795	ND	1828-1795	950	1923-1909	2900	1963-1954	3600	1939-1928	1900	1956-1948	3300	1959-1945	5400	1952-1942	5700	1952-1937
								5000	1954-1945					3300	1945-1934	12000	1942-1931		
Benzo(a)pyrene	3900	1200	1995-1961	3500	1995-1961	3000	1995-1980	1500	1995-1990	7400	1995-1983	1400	1995-1987	1400	1995-1991	2400	1995-1989	2000	1995-1980
ppb	soil	1900	1961-1928	3300	1961-1928	4300	1980-1966	1800	1990-1985	1900	1983-1972	1400	1987-1979	1300	1991-1984	2600	1989-1973	2100	1980-1980
mean: 3231		9900	1928-1895	5500	1928-1895	2800	1966-1952	2300	1985-1976	5000	1972-1961	2400	1979-1971	2200	1984-1977	2200	1973-1968	1900	1980-1966
high: 130000		ND	1895-1861	ND	1895-1861	3100	1952-1937	2400	1976-1963	1800	1961-1950	2300	1971-1964	4200	1977-1959	2900	1968-1952	3500	1966-1952
top 20		ND	1861-1828	ND	1861-1828	3000	1937-1923	2500	1967-1958	4100	1950-1939	2200	1964-1956	3700	1970-1952	3400	1958-1947	3700	1952-1952
above mean		ND	1828-1795	ND	1828-1795	830	1923-1909	2100	1963-1954	3200	1939-1928	2100	1956-1948	4000	1959-1945	4300	1952-1942	5400	1952-1937
								4700	1954-1945					3400	1945-1934	11000	1942-1931		
Benzo(b)fluoranthene	6100	1100	1995-1961	2700	1995-1961	3600	1995-1980	1500	1995-1990	6700	1995-1983	1200	1995-1987	1300	1995-1991	2400	1995-1989	2200	1995-1980
ppb	soil	2000	1961-1928	3800	1961-1928	5000	1980-1966	1600	1990-1985	1400	1983-1972	1400	1987-1979	1300	1991-1984	2500	1989-1973	2600	1980-1980
mean: 2865		8000	1928-1895	4800	1928-1895	2700	1966-1952	1900	1985-1976	3600	1972-1961	2000	1979-1971	2400	1984-1977	1600	1973-1968	2300	1980-1966
high: 100000		ND	1895-1861	ND	1895-1861	4100	1952-1937	2300	1976-1963	2400	1961-1950	ND	1971-1964	5200	1977-1959	3100	1968-1952	3700	1966-1952
top 20		ND	1861-1828	ND	1861-1828	2400	1937-1923	1800	1967-1958	4000	1950-1939	2200	1964-1956	3100	1970-1952	3100	1958-1947	3100	1952-1952
above mean		ND	1828-1795	ND	1828-1795	520	1923-1909	1900	1963-1954	2400	1939-1928	1900	1956-1948	3900	1959-1945	3600	1952-1942	5000	1952-1937
								3900	1954-1945					3100	1945-1934	4000	1942-1931		
Benzo(g,h,i)perylene	1100	ND	1995-1961	1200	1995-1961	2200	1995-1980	800	1995-1990	ND	1995-1983	ND	1995-1987	ND	1995-1991	1500	1995-1989	1600	1995-1980
ppb	soil	ND	1961-1928	1300	1961-1928	1300	1980-1966	840	1990-1985	ND	1983-1972	ND	1987-1979	ND	1991-1984	1700	1989-1973	1800	1980-1980
mean: 2030		ND	1928-1895	3200	1928-1895	910	1966-1952	1000	1985-1976	1500	1972-1961	ND	1979-1971	ND	1984-1977	1500	1973-1968	1500	1980-1966
high: 63000		ND	1895-1861	ND	1895-1861	980	1952-1937	1700	1976-1963	ND	1961-1950	ND	1971-1964	1900	1977-1959	2000	1968-1952	2800	1966-1952
top 20		ND	1861-1828	ND	1861-1828	780	1937-1923	1600	1967-1958	ND	1950-1939	ND	1964-1956	ND	1970-1952	2400	1958-1947	2900	1952-1952
above mean		ND	1828-1795	ND	1828-1795	ND	1923-1909	1300	1963-1954	1200	1939-1928	1200	1956-1948	ND	1959-1945	2400	1952-1942	3600	1952-1937
								4000	1954-1945					1200	1945-1934	3100	1942-1931		
Benzo(k)fluoranthene	3300	1100	1995-1961	3700	1995-1961	2900	1995-1980	1000	1995-1990	5200	1995-1983	1600	1995-1987	1400	1995-1991	1600	1995-1989	1600	1995-1980
ppb	soil	1500	1961-1928	2500	1961-1928	2200	1980-1966	1600	1990-1985	2300	1983-1972	1400	1987-1979	920	1991-1984	1800	1989-1973	2000	1980-1980
mean: 2556		4200	1928-1895	2600	1928-1895	1600	1966-1952	1800	1985-1976	3600	1972-1961	2600	1979-1971	2600	1984-1977	2500	1973-1968	1700	1980-1966
high: 63000		ND	1895-1861	ND	1895-1861	2600	1952-1937	2300	1976-1963	1500	1961-1950	ND	1971-1964	2800	1977-1959	1800	1968-1952	2500	1966-1952
top 20		ND	1861-1828	ND	1861-1828	2100	1937-1923	3000	1967-1958	3200	1950-1939	1800	1964-1956	3400	1970-1952	2400	1958-1947	3300	1952-1952
above mean		ND	1828-1795	ND	1828-1795	640	1923-1909	2000	1963-1954	3300	1939-1928	1800	1956-1948	3100	1959-1945	2800	1952-1942	3500	1952-1937
								3000	1954-1945					3300	1945-1934	4400	1942-1931		

ND = Non detect
NA = Not Analyzed
R = Data Rejected

CRUCIB EL
"Mud Flats", Transect ..., and Transect 14
PAHs

Contaminant		MUDFLATS						TRANSECT 15						TRANSECT 14					
	Site Use	Core 289	Dates	Core 290	Dates	Core 291	Dates	Core 245	Dates	Core 244	Dates	Core 243	Dates	Core 242	Dates	Core 241	Dates	Core 240	Dates
Chrysene	4800	1400	1995-1961	4300	1995-1961	4300	1995-1980	1800	1995-1990	8900	1995-1983	1200	1995-1987	1400	1995-1991	3000	1995-1989	2800	1995-1980
ppb	soil	2400	1961-1928	4600	1961-1928	6200	1980-1966	2500	1990-1985	2600	1983-1972	1500	1987-1979	1200	1991-1984	3200	1989-1973	2800	1980-1980
mean: 3915		12000	1928-1895	6600	1928-1895	4400	1966-1952	3100	1985-1976	5200	1972-1961	2500	1979-1971	3400	1984-1977	3000	1973-1968	2700	1980-1966
high: 150000		ND	1895-1861	ND	1895-1861	4800	1952-1937	3700	1976-1963	1500	1961-1950	2900	1971-1964	5800	1977-1959	4200	1968-1952	4700	1966-1952
top 20		ND	1861-1828	ND	1861-1828	4700	1937-1923	4500	1967-1958	6300	1950-1939	2300	1964-1956	3500	1970-1952	4600	1958-1947	4800	1952-1952
above mean		ND	1828-1795	ND	1828-1795	1000	1923-1909	3500	1963-1954	4500	1939-1928	2100	1956-1948	2900	1959-1945	5900	1952-1942	6200	1952-1937
								5200	1954-1945					3400	1945-1934	12000	1942-1931		
Dibenz(a,h)anthracene	300	ND	1995-1961	ND	1995-1961	1000	1995-1980	ND	1995-1990	ND	1995-1983	ND	1995-1987	ND	1995-1991	ND	1995-1989	ND	1995-1980
ppb	soil	ND	1961-1928	ND	1961-1928	ND	1980-1966	800	1990-1985	ND	1983-1972	ND	1987-1979	ND	1991-1984	ND	1989-1973	ND	1980-1980
mean: 1513		930	1928-1895	1000	1928-1895	ND	1966-1952	960	1985-1976	740	1972-1961	ND	1979-1971	ND	1984-1977	ND	1973-1968	ND	1980-1966
high: 25000		ND	1895-1861	ND	1895-1861	ND	1952-1937	1000	1976-1963	ND	1961-1950	ND	1971-1964	ND	1977-1959	990	1968-1952	1400	1966-1952
top 20		ND	1861-1828	ND	1861-1828	ND	1937-1923	880	1967-1958	ND	1950-1939	ND	1964-1956	ND	1970-1952	1200	1958-1947	1400	1952-1952
above mean		ND	1828-1795	ND	1828-1795	ND	1923-1909	ND	1963-1954	ND	1939-1928	ND	1956-1948	ND	1959-1945	1200	1952-1942	1900	1952-1937
								1000	1954-1945					ND	1945-1934	1500	1942-1931		
Fluoranthene	7400	2500	1995-1961	6500	1995-1961	6600	1995-1980	2700	1995-1990	25000	1995-1983	2000	1995-1987	2300	1995-1991	4400	1995-1989	4600	1995-1980
ppb	soil	4300	1961-1928	5500	1961-1928	7700	1980-1966	4000	1990-1985	5000	1983-1972	2300	1987-1979	2100	1991-1984	4400	1989-1973	4900	1980-1980
mean: 6820		21000	1928-1895	9800	1928-1895	5200	1966-1952	4900	1985-1976	8800	1972-1961	4300	1979-1971	5500	1984-1977	5400	1973-1968	4400	1980-1966
high: 320000		ND	1895-1861	ND	1895-1861	5400	1952-1937	6500	1976-1963	4200	1961-1950	4800	1971-1964	8000	1977-1959	6500	1968-1952	7900	1966-1952
top 20		ND	1861-1828	ND	1861-1828	5900	1937-1923	5800	1967-1958	8400	1950-1939	3500	1964-1956	5800	1970-1952	7000	1958-1947	6800	1952-1952
above mean		ND	1828-1795	ND	1828-1795	1800	1923-1909	5100	1963-1954	6100	1939-1928	3200	1956-1948	5500	1959-1945	8800	1952-1942	8300	1952-1937
								7400	1954-1945					6000	1945-1934	15000	1942-1931		
Fluorene	500	ND	1995-1961	880	1995-1961	ND	1995-1980	ND	1995-1990	14000	1995-1983	ND	1995-1987	ND	1995-1991	ND	1995-1989	ND	1995-1980
ppb	soil	ND	1961-1928	ND	1961-1928	1100	1980-1966	ND	1990-1985	ND	1983-1972	ND	1987-1979	ND	1991-1984	ND	1989-1973	ND	1980-1980
mean: 3432		ND	1928-1895	770	1928-1895	1400	1966-1952	1200	1985-1976	860	1972-1961	ND	1979-1971	910	1984-1977	ND	1973-1968	ND	1980-1966
high: 140000		ND	1895-1861	ND	1895-1861	1000	1952-1937	870	1976-1963	1100	1961-1950	ND	1971-1964	1800	1977-1959	980	1968-1952	1000	1966-1952
top 20		ND	1861-1828	ND	1861-1828	2000	1937-1923	1000	1967-1958	1500	1950-1939	ND	1964-1956	1100	1970-1952	1100	1958-1947	870	1952-1952
above mean		ND	1828-1795	ND	1828-1795	ND	1923-1909	920	1963-1954	1900	1939-1928	ND	1956-1948	ND	1959-1945	1700	1952-1942	1500	1952-1937
								1900	1954-1945					1400	1945-1934	5100	1942-1931		
Indeno(1,2,3-cd)pyrene	1100	ND	1995-1961	1100	1995-1961	2400	1995-1980	1000	1995-1990	2400	1995-1983	ND	1995-1987	ND	1995-1991	1500	1995-1989	1400	1995-1980
ppb	soil	ND	1961-1928	1100	1961-1928	1600	1980-1966	1400	1990-1985	ND	1983-1972	ND	1987-1979	ND	1991-1984	1700	1989-1973	1700	1980-1980
mean: 1886		ND	1928-1895	2900	1928-1895	1200	1966-1952	1800	1985-1976	1500	1972-1961	1200	1979-1971	ND	1984-1977	1600	1973-1968	1400	1980-1966
high: 57000		ND	1895-1861	ND	1895-1861	1200	1952-1937	1900	1976-1963	ND	1961-1950	ND	1971-1964	1300	1977-1959	2100	1968-1952	2800	1966-1952
top 20		ND	1861-1828	ND	1861-1828	1000	1937-1923	1700	1967-1958	1400	1950-1939	990	1964-1956	1100	1970-1952	2300	1958-1947	2900	1952-1952
above mean		ND	1828-1795	ND	1828-1795	ND	1923-1909	1500	1963-1954	1200	1939-1928	990	1956-1948	1200	1959-1945	2700	1952-1942	3800	1952-1937
								2800	1954-1945					1200	1945-1934	3500	1942-1931		
Naphthalene	500	ND	1995-1961	ND	1995-1961	ND	1995-1980	ND	1995-1990	35000	1995-1983	ND	1995-1987	ND	1995-1991	ND	1995-1989	ND	1995-1980
ppb	soil	ND	1961-1928	ND	1961-1928	630	1980-1966	ND	1990-1985	ND	1983-1972	ND	1987-1979	ND	1991-1984	ND	1989-1973	ND	1980-1980
mean: 9587		890	1928-1895	580	1928-1895	ND	1966-1952	3200	1985-1976	470	1972-1961	ND	1979-1971	ND	1984-1977	ND	1973-1968	ND	1980-1966
high: 270000		ND	1895-1861	ND	1895-1861	ND	1952-1937	ND	1976-1963	ND	1961-1950	ND	1971-1964	1200	1977-1959	ND	1968-1952	ND	1966-1952
top 20		ND	1861-1828	ND	1861-1828	640	1937-1923	ND	1967-1958	650	1950-1939	ND	1964-1956	ND	1970-1952	ND	1958-1947	ND	1952-1952
above mean		ND	1828-1795	ND	1828-1795	ND	1923-1909	770	1963-1954	5800	1939-1928	ND	1956-1948	ND	1959-1945	1000	1952-1942	2800	1952-1937
								1800	1954-1945					760	1945-1934	8500	1942-1931		
Phenanthrene	6200	ND	1995-1961	2100	1995-1961	2000	1995-1980	1000	1995-1990	41000	1995-1983	ND	1995-1987	ND	1995-1991	1800	1995-1989	1100	1995-1980
ppb	soil	840	1961-1928	2700	1961-1928	4900	1980-1966	1800	1990-1985	3400	1983-1972	940	1987-1979	1000	1991-1984	2200	1989-1973	1900	1980-1980
mean: 7097		14000	1928-1895	4200	1928-1895	5400	1966-1952	5100	1985-1976	5500	1972-1961	2200	1979-1971	3800	1984-1977	3300	1973-1968	2000	1980-1966
high: 570000		ND	1895-1861	ND	1895-1861	4200	1952-1937	3700	1976-1963	2400	1961-1950	3500	1971-1964	5600	1977-1959	5100	1968-1952	3000	1966-1952
top 20		ND	1861-1828	ND	1861-1828	7100	1937-1923	4000	1967-1958	8600	1950-1939	1900	1964-1956	4100	1970-1952	5600	1958-1947	3900	1952-1952
above mean		ND	1828-1795	ND	1828-1795	ND	1923-1909	4300	1963-1954	7200	1939-1928	2300	1956-1948	3800	1959-1945	8100	1952-1942	7200	1952-1937
								8300	1954-1945					7000	1945-1934	30000	1942-1931		
Pyrene	11000	2600	1995-1961	12000	1995-1961	11000	1995-1980	2800	1995-1990	22000	1995-1983	1900	1995-1987	2100	1995-1991	4200	1995-1989	5300	1995-1980
ppb	soil	4800	1961-1928	10000	1961-1928	14000	1980-1966	4600	1990-1985	4900	1983-1972	2100	1987-1979	1900	1991-1984	5000	1989-1973	5100	1980-1980
mean: 7807		22000	1928-1895	16000	1928-1895	9000	1966-1952	6500	1985-1976	9500	1972-1961	4300	1979-1971	6200	1984-1977	6400	1973-1968	5100	1980-1966
high: 340000		ND	1895-1861	ND	1895-1861	10000	1952-1937	7700	1976-1963	5100	1961-1950	5200	1971-1964	11000	1977-1959	9000	1968-1952	9200	1966-1952
top 20		ND	1861-1828	ND	1861-1828	11000	1937-1923	8000	1967-1958	10000	1950-1939	3600	1964-1956	8400	1970-1952	9500	1958-1947	10000	1952-1952
above mean		ND	1828-1795	ND	1828-1795	2200	1923-1909	8000	1963-1954	7200	1939-1928	3600	1956-1948	8000	1959-1945	12000	1952-1942	13000	1952-1937
								11000	1954-1945					6900	1945-1934	27000	1942-1931		

ND = Non detect
NA = Not Analyzed
R = Data Rejected

CRUCIB\ TEEL
"Mud Flats", Transect 15, and Transect 14
Inorganics

		MUDFLATS						TRANSECT 15						TRANSECT 14					
Contaminant	Site Use	Core 289	Dates	Core 290	Dates	Core 291	Dates	Core 245	Dates	Core 244	Dates	Core 243	Dates	Core 242	Dates	Core 241	Dates	Core 240	Dates
Antimony	79.3	NA	1995-1961	NA	1995-1961	ND	1995-1980	ND	1995-1990	ND	1995-1983	ND	1995-1987	ND	1995-1991	ND	1995-1989	ND	1995-1980
(mg/Kg)	soil	NA	1961-1928	NA	1961-1928	ND	1980-1966	ND	1990-1985	ND	1983-1972	ND	1987-1979	ND	1991-1984	ND	1989-1973	ND	1980-1980
		NA	1928-1895	NA	1928-1895	ND	1966-1952	ND	1985-1976	ND	1972-1961	ND	1979-1971	ND	1984-1977	ND	1973-1968	ND	1980-1966
mean: 850		ND	1895-1861	NA	1895-1861	ND	1952-1937	ND	1976-1963	ND	1961-1950	ND	1971-1964	ND	1977-1959	ND	1968-1952	ND	1966-1952
high: 7,560		ND	1861-1828	NA	1861-1828	ND	1937-1923	ND	1967-1958	ND	1950-1939	ND	1964-1956	ND	1970-1952	ND	1958-1947	ND	1952-1952
		ND	1828-1795	NA	1828-1795	ND	1923-1909	ND	1963-1954	ND	1939-1928	ND	1956-1948	ND	1959-1945	ND	1952-1942	ND	1952-1937
top 20								ND	1954-1945					ND	1945-1934	ND	1942-1931		
above mean																			
Arsenic	59.2	NA	1995-1961	NA	1995-1961	45.3	1995-1980	8.5	1995-1990	10.1	1995-1983	9.6	1995-1987	7.2	1995-1991	8.7	1995-1989	31.1	1995-1980
(mg/Kg)	soil	NA	1961-1928	NA	1961-1928	44.4	1980-1966	12.4	1990-1985	9.6	1983-1972	11.2	1987-1979	9.5	1991-1984	5.5	1989-1973	39.2	1980-1980
		NA	1928-1895	NA	1928-1895	22.7	1966-1952	23.2	1985-1976	6.7	1972-1961	34.6	1979-1971	12.6	1984-1977	22	1973-1968	49.4	1980-1966
mean: 20		6.5	1895-1861	NA	1895-1861	28.1	1952-1937	41	1976-1963	28.7	1961-1950	38.5	1971-1964	40.1	1977-1959	29.5	1968-1952	42.9	1966-1952
high: 125		6.4	1861-1828	NA	1861-1828	16.6	1937-1923	28.8	1967-1958	23.6	1950-1939	33.8	1964-1956	39.4	1970-1952	31.5	1958-1947	19.7	1952-1952
		5.1	1828-1795	NA	1828-1795	12.9	1923-1909	32	1963-1954	58	1939-1928	37.2	1956-1948	55	1959-1945	30.6	1952-1942	37.3	1952-1937
top 20								67.8	1954-1945					82.2	1945-1934	62.1	1942-1931		
above mean																			
Barium	none known	NA	1995-1961	NA	1995-1961	265	1995-1980	131	1995-1990	152	1995-1983	197	1995-1987	154	1995-1991	120	1995-1989	335	1995-1980
(mg/Kg)		NA	1961-1928	NA	1961-1928	314	1980-1966	215	1990-1985	179	1983-1972	204	1987-1979	169	1991-1984	205	1989-1973	373	1980-1980
		NA	1928-1895	NA	1928-1895	260	1966-1952	277	1985-1976	68	1972-1961	296	1979-1971	255	1984-1977	302	1973-1968	392	1980-1966
mean: 213		55	1895-1861	NA	1895-1861	392	1952-1937	320	1976-1963	280	1961-1950	316	1971-1964	321	1977-1959	366	1968-1952	348	1966-1952
high: 1330		70.1	1861-1828	NA	1861-1828	165	1937-1923	338	1967-1958	224	1950-1939	327	1964-1956	339	1970-1952	348	1958-1947	313	1952-1952
		66.2	1828-1795	NA	1828-1795	32.3	1923-1909	349	1963-1954	221	1939-1928	343	1956-1948	349	1959-1945	311	1952-1942	335	1952-1937
top 20								296	1954-1945					398	1945-1934	392	1942-1931		
above mean																			
Berylium	none known	NA	1995-1961	NA	1995-1961	ND	1995-1980	ND	1995-1990	ND	1995-1983	ND	1995-1987	ND	1995-1991	ND	1995-1989	ND	1995-1980
(mg/Kg)		NA	1961-1928	NA	1961-1928	0.77	1980-1966	0.96	1990-1985	ND	1983-1972	ND	1987-1979	ND	1991-1984	ND	1989-1973	ND	1980-1980
		NA	1928-1895	NA	1928-1895	0.71	1966-1952	ND	1985-1976	ND	1972-1961	ND	1979-1971	ND	1984-1977	0.95	1973-1968	ND	1980-1966
mean: 0.92		0.8	1895-1861	NA	1895-1861	1.1	1952-1937	0.97	1976-1963	0.94	1961-1950	ND	1971-1964	1.1	1977-1959	1.1	1968-1952	1.2	1966-1952
high: 1.30		ND	1861-1828	NA	1861-1828	ND	1937-1923	1	1967-1958	0.48	1950-1939	ND	1964-1956	1.1	1970-1952	1	1958-1947	0.66	1952-1952
		0.86	1828-1795	NA	1828-1795	ND	1923-1909	ND	1963-1954	ND	1939-1928	1	1956-1948	1.1	1959-1945	ND	1952-1942	0.81	1952-1937
top 20								ND	1954-1945					1	1945-1934	ND	1942-1931		
above mean																			
Cadmium	16.3	NA	1995-1961	NA	1995-1961	14.4	1995-1980	4.4	1995-1990	4.5	1995-1983	6.8	1995-1987	4.4	1995-1991	4.5	1995-1989	16.2	1995-1980
(mg/Kg)	soil	NA	1961-1928	NA	1961-1928	29.2	1980-1966	9.4	1990-1985	8	1983-1972	8.9	1987-1979	5.9	1991-1984	6.8	1989-1973	20.5	1980-1980
		NA	1928-1895	NA	1928-1895	21.5	1966-1952	13.9	1985-1976	3.2	1972-1961	25.8	1979-1971	18	1984-1977	14.4	1973-1968	24.3	1980-1966
mean: 11.77		ND	1895-1861	NA	1895-1861	22.2	1952-1937	23.4	1976-1963	26.8	1961-1950	27.3	1971-1964	32.2	1977-1959	31.1	1968-1952	25.5	1966-1952
high: 39.60		ND	1861-1828	NA	1861-1828	5.2	1937-1923	32.2	1967-1958	4	1950-1939	32.7	1964-1956	39.2	1970-1952	34.2	1958-1947	33.7	1952-1952
		ND	1828-1795	NA	1828-1795	ND	1923-1909	38.4	1963-1954	14.4	1939-1928	36	1956-1948	33.4	1959-1945	26.8	1952-1942	28.1	1952-1937
top 20								19.2	1954-1945					18.9	1945-1934	18.2	1942-1931		
above mean																			

ND = Non detect
NA = Not Analyzed
R = Data Rejected

CRUCIBLE STEEL
"Mud Flats", Transect 15, and Transect 14
Inorganics

		MUDFLATS						TRANSECT 15						TRANSECT 14					
Contaminant	Site Use	Core 289	Dates	Core 290	Dates	Core 291	Dates	Core 245	Dates	Core 244	Dates	Core 243	Dates	Core 242	Dates	Core 241	Dates	Core 240	Dates
Copper	432	NA	1995-1961	NA	1995-1961	393	1995-1980	179	1995-1990	185	1995-1983	275	1995-1987	176	1995-1991	160	1995-1989	515	1995-1980
(mg/Kg)	soil	NA	1961-1928	NA	1961-1928	488	1980-1966	266	1990-1985	249	1983-1972	295	1987-1979	231	1991-1984	240	1989-1973	839	1980-1980
		NA	1928-1895	NA	1928-1895	384	1966-1952	454	1985-1976	139	1972-1961	551	1979-1971	473	1984-1977	441	1973-1968	729	1980-1966
mean: 312		12.1	1895-1861	NA	1895-1861	585	1952-1937	563	1976-1963	551	1961-1950	588	1971-1964	648	1977-1959	622	1968-1952	583	1966-1952
high: 3,020		12.5	1861-1828	NA	1861-1828	225	1937-1923	622	1967-1958	304	1950-1939	675	1964-1956	737	1970-1952	640	1958-1947	828	1952-1952
		11.4	1828-1795	NA	1828-1795	76.6	1923-1909	636	1963-1954	442	1939-1928	733	1956-1948	752	1959-1945	619	1952-1942	658	1952-1937
top 20								577	1954-1945					688	1945-1934	702	1942-1931		
above mean																			
Chromium	437	NA	1995-1961	NA	1995-1961	248	1995-1980	122	1995-1990	124	1995-1983	207	1995-1987	120	1995-1991	95.1	1995-1989	580	1995-1980
(mg/Kg)	soil	NA	1961-1928	NA	1961-1928	356	1980-1966	243	1990-1985	260	1983-1972	274	1987-1979	182	1991-1984	194	1989-1973	696	1980-1980
		NA	1928-1895	NA	1928-1895	287	1966-1952	476	1985-1976	93.9	1972-1961	1180	1979-1971	494	1984-1977	440	1973-1968	969	1980-1966
mean: 307		31	1895-1861	NA	1895-1861	381	1952-1937	782	1976-1963	940	1961-1950	1220	1971-1964	985	1977-1959	793	1968-1952	825	1966-1952
high: 2160		34.1	1861-1828	NA	1861-1828	134	1937-1923	780	1967-1958	143	1950-1939	1070	1964-1956	840	1970-1952	533	1958-1947	518	1952-1952
		34.3	1828-1795	NA	1828-1795	51	1923-1909	564	1963-1954	430	1939-1928	1070	1956-1948	571	1959-1945	357	1952-1942	397	1952-1937
top 20								345	1954-1945					447	1945-1934	426	1942-1931		
above mean																			
Iron		NA	1995-1961	NA	1995-1961	21500	1995-1980	24600	1995-1990	21800	1995-1983	34800	1995-1987	25900	1995-1991	21900	1995-1989	33400	1995-1980
(mg/Kg)		NA	1961-1928	NA	1961-1928	21100	1980-1966	24800	1990-1985	17900	1983-1972	28100	1987-1979	25700	1991-1984	25700	1989-1973	29500	1980-1980
		NA	1928-1895	NA	1928-1895	19200	1966-1952	27800	1985-1976	13900	1972-1961	29200	1979-1971	27800	1984-1977	28300	1973-1968	30200	1980-1966
		31500	1895-1861	NA	1895-1861	26600	1952-1937	27100	1976-1963	25900	1961-1950	29100	1971-1964	30000	1977-1959	29700	1968-1952	31400	1966-1952
		32000	1861-1828	NA	1861-1828	19500	1937-1923	27200	1967-1958	16200	1950-1939	30100	1964-1956	30200	1970-1952	29100	1958-1947	27400	1952-1952
		30900	1828-1795	NA	1828-1795	16300	1923-1909	26400	1963-1954	21700	1939-1928	30500	1956-1948	30800	1959-1945	28300	1952-1942	24400	1952-1937
								24900	1954-1945					31400	1945-1934	31600	1942-1931		
Lead	3710	NA	1995-1961	NA	1995-1961	544	1995-1980	269	1995-1990	544	1995-1983	655	1995-1987	305	1995-1991	298	1995-1989	714	1995-1980
(mg/Kg)	soil	NA	1961-1928	NA	1961-1928	541	1980-1966	511	1990-1985	420	1983-1972	434	1987-1979	409	1991-1984	364	1989-1973	792	1980-1980
		NA	1928-1895	NA	1928-1895	447	1966-1952	607	1985-1976	331	1972-1961	682	1979-1971	763	1984-1977	737	1973-1968	858	1980-1966
mean: 462		12	1895-1861	NA	1895-1861	723	1952-1937	679	1976-1963	611	1961-1950	747	1971-1964	737	1977-1959	804	1968-1952	741	1966-1952
high: 17,900		11.5	1861-1828	NA	1861-1828	261	1937-1923	761	1967-1958	414	1950-1939	865	1964-1956	735	1970-1952	770	1958-1947	736	1952-1952
		10.4	1828-1795	NA	1828-1795	88.4	1923-1909	743	1963-1954	514	1939-1928	792	1956-1948	745	1959-1945	746	1952-1942	832	1952-1937
top 20								605	1954-1945					747	1945-1934	771	1942-1931		
above mean																			
Mercury	10.2	NA	1995-1961	NA	1995-1961	6.5	1995-1980	2.8	1995-1990	2.9	1995-1983	4.4	1995-1987	2.8	1995-1991	2	1995-1989	10.7	1995-1980
(mg/Kg)	soil	NA	1961-1928	NA	1961-1928	6.2	1980-1966	4.9	1990-1985	7.3	1983-1972	6.1	1987-1979	4.7	1991-1984	4.1	1989-1973	14.5	1980-1980
		NA	1928-1895	NA	1928-1895	3.4	1966-1952	10	1985-1976	2.6	1972-1961	16.1	1979-1971	13.3	1984-1977	8.9	1973-1968	0.06	1980-1966
mean: 6.92		ND	1895-1861	NA	1895-1861	5	1952-1937	12.6	1976-1963	9.7	1961-1950	13.3	1971-1964	19.4	1977-1959	20.4	1968-1952	13.1	1966-1952
high: 28.3		ND	1861-1828	NA	1861-1828	4.3	1937-1923	10.6	1967-1958	4.6	1950-1939	13.3	1964-1956	21.9	1970-1952	16	1958-1947	13.8	1952-1952
		ND	1828-1795	NA	1828-1795	2.1	1923-1909	14.5	1963-1954	8	1939-1928	16.8	1956-1948	14.4	1959-1945	10.3	1952-1942	9.8	1952-1937
top 20								8	1954-1945					11.7	1945-1934	9.4	1942-1931		
above mean																			

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ND = Non detect
NA = Not Analyzed
R = Data Rejected

CRUCIB. TEEL
"Mud Flats", Transect 15, and Transect 14
Inorganics

		MUDFLATS						TRANSECT 15						TRANSECT 14					
Contaminant	Site Use	Core 289	Dates	Core 290	Dates	Core 291	Dates	Core 245	Dates	Core 244	Dates	Core 243	Dates	Core 242	Dates	Core 241	Dates	Core 240	Dates
Nickel	1530	NA	1995-1961	NA	1995-1961	73.9	1995-1980	38.9	1995-1990	37.6	1995-1983	55.3	1995-1987	41	1995-1991	30.2	1995-1989	91.7	1995-1980
(mg/Kg)	soil	NA	1961-1928	NA	1961-1928	105	1980-1966	53.9	1990-1985	69.4	1983-1972	52.8	1987-1979	57.2	1991-1984	51.2	1989-1973	93.6	1980-1980
		NA	1928-1895	NA	1928-1895	89.5	1966-1952	72.3	1985-1976	49.7	1972-1961	98.9	1979-1971	110	1984-1977	80.4	1973-1968	126	1980-1966
mean: 56.65		25.8	1895-1861	NA	1895-1861	80.7	1952-1937	83.1	1976-1963	80.3	1961-1950	105	1971-1964	96.2	1977-1959	100	1968-1952	86.2	1966-1952
high: 369		27.1	1861-1828	NA	1861-1828	46.7	1937-1923	79.8	1967-1958	38.7	1950-1939	101	1964-1956	101	1970-1952	92.3	1958-1947	81.8	1952-1952
		24.6	1828-1795	NA	1828-1795	12.3	1923-1909	86.8	1963-1954	66.4	1939-1928	95	1956-1948	110	1959-1945	93.3	1952-1942	82.9	1952-1937
top 20								73.5	1954-1945					96.6	1945-1934	98.8	1942-1931		
above mean																			
Selenium	5.54	ND	1995-1961	0.86	1995-1961	2.5	1995-1980	ND	1995-1990	ND	1995-1983	ND	1995-1987	ND	1995-1991	0.89	1995-1989	1.1	1995-1980
(mg/Kg)	soil	1.1	1961-1928	R	1961-1928	2.1	1980-1966	0.91	1990-1985	1.1	1983-1972	1.5	1987-1979	0.95	1991-1984	0.99	1989-1973	1.3	1980-1980
		2.4	1928-1895	1.2	1928-1895	1.4	1966-1952	1.2	1985-1976	ND	1972-1961	1.8	1979-1971	1.3	1984-1977	1.1	1973-1968	2.4	1980-1966
		ND	1895-1861	ND	1895-1861	2.7	1952-1937	2	1976-1963	2	1961-1950	1.9	1971-1964	2.2	1977-1959	ND	1968-1952	1.5	1966-1952
		ND	1861-1828	ND	1861-1828	1.2	1937-1923	2.1	1967-1958	1.3	1950-1939	2	1964-1956	2.7	1970-1952	ND	1958-1947	2.2	1952-1952
		ND	1828-1795	ND	1828-1795	ND	1923-1909	2.2	1963-1954	1.8	1939-1928	2.4	1956-1948	2.9	1959-1945	ND	1952-1942	4.7	1952-1937
								1	1954-1945					4.5	1945-1934	2.6	1942-1931		
Silver	10.7	NA	1995-1961	NA	1995-1961	9.3	1995-1980	4.4	1995-1990	8.7	1995-1983	8.7	1995-1987	3.9	1995-1991	3.4	1995-1989	11.8	1995-1980
(mg/Kg)	soil	NA	1961-1928	NA	1961-1928	14.5	1980-1966	6.4	1990-1985	5.5	1983-1972	11	1987-1979	5.6	1991-1984	7.6	1989-1973	15.1	1980-1980
		NA	1928-1895	NA	1928-1895	7.8	1966-1952	9.6	1985-1976	1.8	1972-1961	12.7	1979-1971	8.9	1984-1977	10.2	1973-1968	14.7	1980-1966
mean: 8.43		ND	1895-1861	NA	1895-1861	9.4	1952-1937	13	1976-1963	12.2	1961-1950	13.1	1971-1964	14.4	1977-1959	15.6	1968-1952	14.2	1966-1952
high: 21.40		ND	1861-1828	NA	1861-1828	2.1	1937-1923	14.4	1967-1958	2.6	1950-1939	14.1	1964-1956	18.3	1970-1952	17.6	1958-1947	15.4	1952-1952
		ND	1828-1795	NA	1828-1795	ND	1923-1909	14.6	1963-1954	8.7	1939-1928	16.8	1956-1948	21.4	1959-1945	20.5	1952-1942	19.5	1952-1937
top 20								12.9	1954-1945					12.1	1945-1934	10.9	1942-1931		
above mean																			
Zinc	1190	NA	1995-1961	NA	1995-1961	1620	1995-1980	473	1995-1990	550	1995-1983	910	1995-1987	569	1995-1991	492	1995-1989	1270	1995-1980
(mg/Kg)	soil	NA	1961-1928	NA	1961-1928	1770	1980-1966	732	1990-1985	804	1983-1972	769	1987-1979	674	1991-1984	687	1989-1973	1590	1980-1980
		NA	1928-1895	NA	1928-1895	1410	1966-1952	1150	1985-1976	417	1972-1961	1460	1979-1971	1480	1984-1977	1150	1973-1968	1810	1980-1966
mean: 770		74.4	1895-1861	NA	1895-1861	2950	1952-1937	1240	1976-1963	1170	1961-1950	1440	1971-1964	1410	1977-1959	1410	1968-1952	1420	1966-1952
high: 3,110		78.4	1861-1828	NA	1861-1828	696	1937-1923	1190	1967-1958	634	1950-1939	1440	1964-1956	1440	1970-1952	1350	1958-1947	1240	1952-1952
		74.7	1828-1795	NA	1828-1795	125	1923-1909	1260	1963-1954	1140	1939-1928	1370	1956-1948	1470	1959-1945	1310	1952-1942	1340	1952-1937
top 20								1260	1954-1945					1480	1945-1934	1510	1942-1931		
above mean																			

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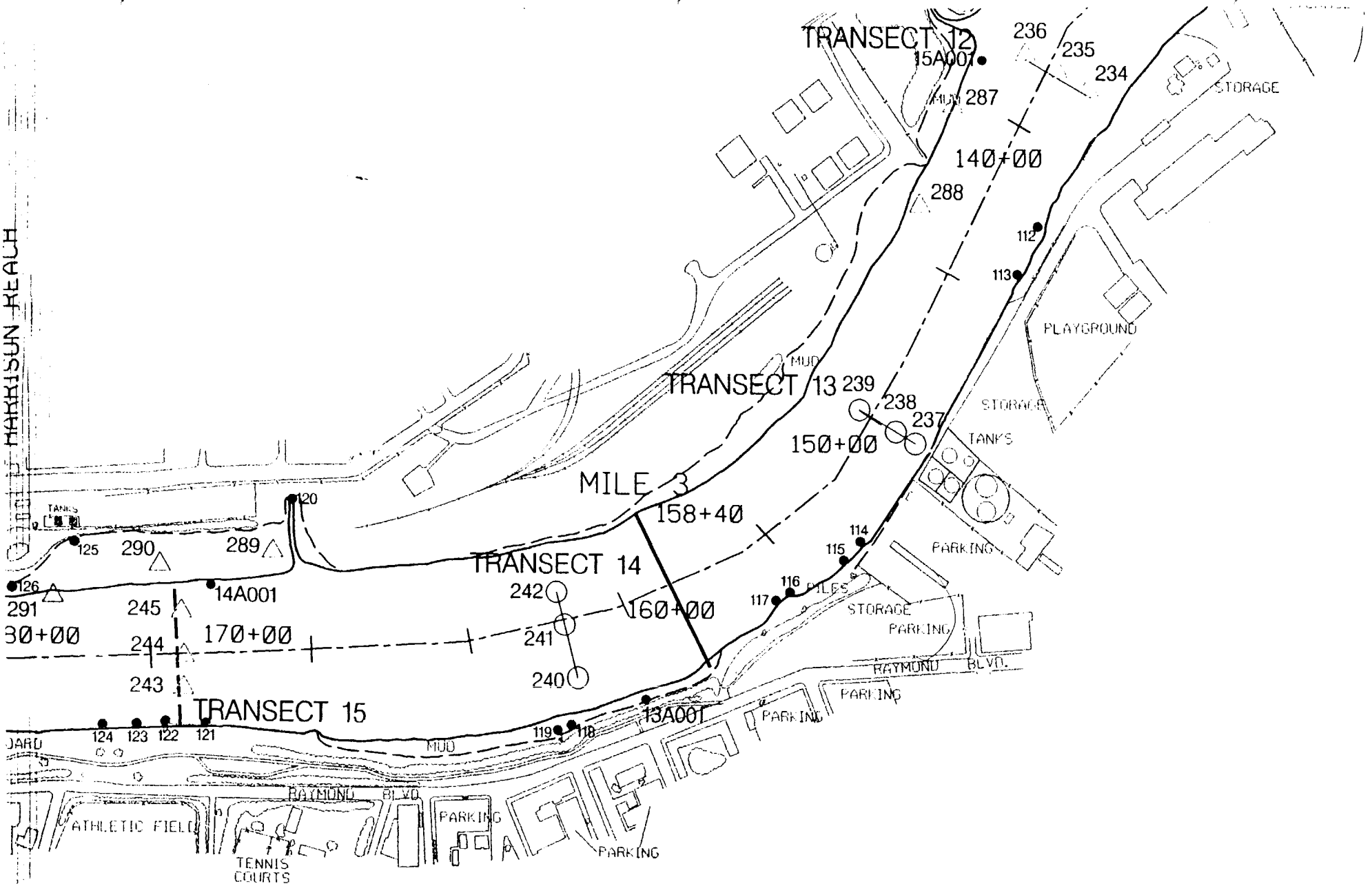
ND = Non detect
NA = Not Analyzed
R = Data Rejected


TRANSECT 12
15A001
236
235
234
287
140+00
288
STORAGE
112
113
PLAYGROUND
MUD
TRANSECT 13
239
238
237
150+00
STORAGE
TANKS
MILE 3
158+40
120
TANKS
125
290
289
TRANSECT 14
114
115
PARKING
126
14A001
242
160+00
116
PILES
117
291
245
170+00
241
STORAGE
PARKING
244
243
240
RAYMOND BLVD.
PARKING
TRANSECT 15
13A001
124
123
122
121
119
118
PARKING
MUD
RAYMOND BLVD.
PARKING
ATHLETIC FIELD
TENNIS COURTS
PARKING

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COLTEC INDUSTRIES, INC.

TAB F

NJDEP ECRA investigations documentation pertaining to hazardous substances on the site.

FIRST ENVIRONMENT

90 Riverdale Road
Riverdale, New Jersey 07457
(201) 616-9700 • FAX (201) 616-1930

February 20, 1990

Mr. Michael Mandracchia
New Jersey Department of Environmental Protection
401 East State Street - 5th Floor
Trenton, New Jersey 08625

Re: Fabco Piping, Inc.
1000 South Fourth Street
Harrison, New Jersey 07029
ECRA Case No. 88800

Dear Mr. Mandracchia:

This letter constitutes the responses prepared by First Environment on behalf of Guyon General Piping, Inc. (Guyon), the property owner of the facility which is the subject of ECRA Case No. 88800, to the ECRA Initial Notice Completeness Checklist, dated June 6, 1989, and forwarded by NJDEP to Fabco Piping, Inc., (FPI). Fabco was a tenant of Guyon at the subject property. Since Fabco did not respond to NJDEP's request to complete the ECRA Initial Notice filed by Fabco on or about August 11, 1989, NJDEP has recently requested that Guyon, as property owner, provide the responses necessary to complete Fabco's ECRA Initial Notice. This letter is in response to that request.

We note that certain information required to complete Fabco's ECRA Initial Notice is specific to the operations conducted by Fabco at the site of which Guyon has no direct knowledge. Guyon has provided such information to the best of its knowledge, information and belief. The BEECRA identified eleven items on the checklist which it considers incomplete. These items are listed below with the required information and/or response.

Item 1. Site History since 1940: Owners, Operators, Dates, Operations, Current Addresses

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Response:

Name	Owner/ Operator	From	Current To	Address
Guyon General Piping, Inc.	Owner	1984	Present	900 Rodgers Blvd. South Harrison, NJ 07029
Fabco Piping, Inc.	Operator	7/1/80	6/30/88	1000 Rodgers Blvd. South Harrison, NJ 07029
Charles F. Guyon, Inc.	Owner	1947	1984	900 Rodgers Blvd. South Harrison, NJ 07029
Charles F. Guyon, Inc.	Operator	1947	1980	900 Rodgers Blvd. South Harrison, NJ 07029
Crucible Steel Co.	Owner/ Operator	1924	1947	
Present Name and Address: Crucible Specialties Metal Division of Crucible Materials Corp. Middle Atlantic Service Center				25 Greenbrook Rd. P.O. Box 554 Fairfield, NJ 07007-0554

Brief Description of Past Operations

Crucible Steel Company (Crucible) owned and operated the facility between in 1924 and 1947. On information and belief, Crucible primarily produced large-bore gun barrels for the United States Government. They also had a stainless steel machining operation. Charles F. Guyon, Inc. acquired the property in 1947. Between 1947 and 1980, the facility was used for storage of steel, in the form of both raw materials and finished goods. On-site processes included pipe fabrication, which involved the cutting, welding and shaping of pipe. From July 1980 through June 1988, the subject facility was leased to Fabco Piping, Inc. (Fabco). Fabco was involved in the fabrication of pipe. Fabco ceased production activities in April of 1987, and maintained a small staff on-site until June 30, 1988. Since that time, the facility has been vacant.

Item 4. Map: To scale, property boundaries shown, all hazmat areas identified, paved vs. unpaved areas identified, legible, adjacent land usage.

Response: See Figure 1-1 and Figure 2-1

Item 5. Operations: Detailed description, emphasis on hazmat areas

Response:

DESCRIPTION OF OPERATIONS

The subject leasehold facility is currently vacant and no industrial processes are conducted on-site. The most recent operator of the subject facility was Fabco, who vacated the premises in June of 1988. Guyon has attempted to reconstruct the operations conducted by Fabco at the site based on interviews with present and past employees of Guyon and a walk-through of the facility. As noted above, Guyon has no direct knowledge of Fabco's specific operations. The following information is forwarded by Guyon to the best of its knowledge.

The subject facility consists of approximately 200,000 square feet of office and fabricating space and is located in an industrial complex in Harrison, New Jersey. The neighborhood adjacent to the complex is heavily industrialized and non-residential. Fabco Piping leased the facility from July 1, 1980 until June 30, 1988 from Charles F. Guyon, Inc. and Guyon General Piping, Inc. Pipe fabrication was performed at the facility. The operations consisted primarily of the fabricating of pipe composed of various steel alloys. Carbon, chromium and stainless steel pipe were used in the fabrication processes. These processes included various treatments, such as heating, cooling, cutting, bending, and welding of pipe and pipe parts. A description of the operations and the areas in which they were performed is provided below. The areas are identified in Figure 2-1.

FACILITY OPERATIONS

AREA 1: SHIPPING AND RECEIVING

The Shipping and Receiving area was located along the western side of the large building complex within the leasehold area. Raw materials were received and finished products were shipped from this area. The foundation is all that remains of the former loading platform adjacent to the Shipping and Receiving area. Along the eastern wall of the Shipping and Receiving area is a storage rack formerly used to hold compressed gas cylinders, including argon, that were used in the pipe fabrication processes.

AREA 2: MACHINE SHOP

The Machine Shop area was located to the east of and adjacent to the Shipping and Receiving area and north of the ramp that connects these two areas. Machines used to shape and fabricate steel parts, along with their respective support equipment, have been abandoned by Fabco in this area.

AREA 3: STAINLESS STEEL PIPE FABRICATION

The Stainless Steel Pipe Fabrication area was located on the northern side of the three large, rectangular steel fabrication areas within the large building complex of the leasehold area. Machines used for welding, brazing, cutting, and sawing, along with makeup tables for stainless steel pipe fabrication have been abandoned by Fabco in this area. There is an electrical control panel located on the southern wall. There is a metal cutting booth along the eastern wall.

AREA 4: CHROMIUM STEEL PIPE FABRICATION

The chromium steel pipe fabrication area was located in the middle section of the three large, rectangular steel fabrication areas within the large building complex of the leasehold area. Machines used for welding, brazing, cutting, and sawing, along with makeup tables for chromium steel pipe fabrication have been abandoned by Fabco in this area. There is an empty, 275-gallon capacity above ground fuel oil storage tank in the northeast corner of this area. The tank rests on the concrete floor and was apparently used as the fuel supply for salamander space heaters.

AREA 5: CARBON STEEL PIPE FABRICATION

The Carbon Steel Pipe Fabrication area was located on the southern side of the three large, rectangular steel fabrication areas within the large building complex of the leasehold area. Machines used for welding, brazing, cutting and sawing, along with make-up tables for carbon steel pipe fabrication have been abandoned by Fabco in this area.

AREA 6: CUTTING AND SAWING

The Cutting and Sawing area was located to the south of and adjacent to the Carbon Steel Pipe Fabrication area. Steel pipe were transported to this area to be cut on saws called "marble saws". After sawing, pipes were transported out of the Cutting and Sawing area to other areas for further fabrication processes.

AREA 7: X-RAY DEPARTMENT

The X-Ray Department was located between the Chromium Steel Pipe Fabrication area and the Carbon Steel Pipe Fabrication area. X-rays were taken of pipe welds and joints as one of many quality control procedures. X-rays were taken using several sealed radioactive isotopes to expose the film. These isotopes include plutonium-238, Iron-55, Cadmium-109, and Americium-241. A telephone call to the Nuclear Regulatory Commission (NRC) revealed that Fabco was issued a license No. 29-21430-01 from 10-14-83 until the expiration date 10-31-88 for the use of these isotopes for the purpose stated. After the X-rays were taken in this area, the negatives were sent to the Darkroom for development.

AREA 8: ANNEALING AND BENDING

The Annealing and Bending area was located in the extreme southeast corner of the large building complex in the leasehold area. Two bending tables and two annealing furnaces have been abandoned by Fabco in this area. One furnace was gas fired and the other was an oil fired unit. An empty 1,500-gallon capacity, above ground No. 2 fuel oil tank is located on a concrete pad in a lean-to enclosure north of the Annealing and Bending area. This fuel was used to fire the oil fired annealing furnace mentioned above.

AREA 9: HEAT TREATMENT

The Heat Treatment area was located in the southwest portion of the large building complex of the leasehold area. Two furnaces have been abandoned by Fabco in this area. One of the furnaces was fueled by No. 2 fuel oil supplied from a 550-gallon capacity above ground steel tank. The tank , that has been abandoned by Fabco, rests on concrete in this area and is now empty. The other furnace was fueled by natural gas. The Heat Treatment area also contains an 800 amp AC/DC electrical power converter which was used to produce the direct current necessary to power the overhead cranes used to lift and move the pipe throughout the fabricating areas.

AREA 10: QUALITY ASSURANCE/QUALITY CONTROL

A Quality Assurance/Quality Control (QA/QC) area was located between the Chromium Steel Pipe Fabrication area and the Carbon Steel Pipe Fabrication area and adjacent to the Machine Shop. An air compressor and a pressure tank that supplied compressed air for the various machines have been abandoned by Fabco in this area. A water tower held water which was recycled and cooled the compressor while it was in operation and has been abandoned by Fabco.

AREA 11: DARKROOM

A Darkroom was located adjacent to the Cutting and Sawing area on the south side of the large building complex in the leasehold area. This area contained the equipment and materials with which the x-ray negatives obtained in the X-Ray Department were developed. The darkroom contained standard photographic processing solutions associated with the development of X-ray film. The sink in the darkroom was connected to the sanitary sewer system along with the adjoining restroom. All hazardous substances or wastes abandoned by Fabco in this area have been disposed of by Guyon. An inventory of the materials previously stored in this area is included as Attachment 1.

AREA 12: PAINT STORAGE

A Paint Storage area was located on the third floor of the large building complex of the leasehold area above the Darkroom. An inventory of the materials abandoned by Fabco, and subsequently disposed of by Guyon, is included as Attachment 2.

AREA 13: REPAIR SHOP

A Repair Shop was located south of and adjacent to the Shipping and Receiving area. Small equipment repairs and repairs to the welding apparatus were apparently done in this area. Welding rods and wire abandoned by Fabco are stored there at the present time.

AREA 14: FURNACE ROOM

A Furnace Room is located in the basement under the main offices of the large building complex of the leasehold area. It contains a natural gas fired forced hot air furnace that furnished heat to the offices in that immediate area of the building. The heat generated by the furnace was supplemented by an electrical heat service in 1947. The hot air ducts were also used for distributing cool air during the summer from the air conditioner unit located in the Furnace Room. There is a sump pump in the corner of the room that pumps accumulated groundwater into the storm drain network on the property.

AREA 15: PRINT SHOP

A Print Shop was located in the basement north of the Furnace Room. Printing ink was used in the offset printing operation in this area. Copies of forms and other internally used documents were produced here by Fabco.

AREA 16: ELECTRIC TRANSFORMERS

Three Electric Transformers are located inside a locked, fenced-in area along the east wall of the Paint Shop building. The transformers are owned by the Public Service Gas and Electric Company (PSE&G). These transformers rest on a concrete pad.

AREA 17: FORMER FLAMMABLE STORAGE

A Flammable Storage area was located outside on the northern side of the large building complex within the leasehold area. The fenced-in area contains two sections which formerly contained a liquid propane tank in one section and a liquid oxygen tank in the other. The tanks are no longer present on the site, and were presumably removed by Fabco.

AREA 18: SANDBLASTING

A Sandblasting operation was located in the extreme southwest corner of the leasehold area. Metal products were apparently sandblasted to clean them after the fabrication process was completed and prior to painting. Excess sandblast grit, approximately 475 tons, abandoned by Fabco was removed and disposed off-site by Guyon. The sandblast grit was sampled and analyzed and found to be non-hazardous. Laboratory results are provided in Attachment 3.

AREA 19: PAINT SHOP

The Paint Shop was located in the southwest corner of the leasehold property. The building was used for painting operations by Fabco. An inventory of the materials abandoned by Fabco in this area and subsequently disposed of by Guyon is included as Attachment 4.

GENERAL OPERATIONS

Water is supplied by the municipality. All sanitary wastes from the leasehold portion of the facility are discharged into common collectors from locations throughout both the leasehold and non-leasehold portions of the industrial complex. Thus, the sanitary waste collection system is considered "common property" of the entire industrial complex. The Passaic Valley Sewerage Commission (PVSC) was contacted and verified that sanitary wastes from the entire industrial complex enter the PVSC collection system and treatment plant in Newark, New Jersey. The stormwater from roof drains and surface water runoff from paved areas within the leasehold area collect in a cistern (see Figure 2-1) which discharges into the Passaic River.

Concrete pipe chases, covered with metal plates are located within the various pipe cutting and machining areas of the leasehold property. These pipe chases contain electric supply conduits for the former power requirements of the facility.

The internal roof drains enter subsurface piping which connects to the stormwater drainage system. External roof drains discharge to either the surface or are connected to the stormwater drainage system.

Several railroad tracks (spurs) run throughout the common access portion of the leasehold. These formerly provided access for trains which brought in materials and carried finished products out of the facility. The railroad tracks interconnect with railroad lines that service other areas of the industrial complex.

All other areas within the leasehold that have not been specifically addressed above appear on Figure 2-1. They represent areas that were used for office work, storage of drygoods and non-hazardous materials, or outside areas that were not directly involved in the facility operations.

Item 6.a.b.c. a. Means of heating facility, number of years
b. Was facility heated by fuel oil at anytime?
c. Demonstration of Integrity of Underground Storage tank(s).

Response:

a. Salamander space heaters fired by No. 2 fuel oil were used to heat some areas of the large building within the leasehold, as were some propane-fired space heaters. The salamanders have a self-contained fuel tank. The main office area in the large building had been heated, from 1940 until Fabco ceased operating in June of 1988, by a natural gas-fired furnace, forced hot air heating system. Also, for forty-one years from 1947 until the Fabco operation ceased in June of 1988, the forced hot air heating system had been supplemented by electric heat.

b. The leasehold buildings have never been heated by fuel oil, other than in space heaters.

c. There have never been any underground storage tanks within the leasehold property.

Item 7. POTW - Name, address, phone number, municipality, state, zip code.

Response: Passaic Valley Sewerage Commission
600 Wilson Avenue
Newark, New Jersey 07105
Telephone (201) 344-1800

Item 8. Types of storage, descriptions, types, locations.
(Drum/AGST/UGST/Landfill/Lagoon/SPC Impoundment, other)

Response: There are three, empty above ground, steel No. 2 fuel oil, storage tanks within the leasehold property. These have been located and described in the Areas of Operation section of the response to Item 5.

Item 9. Inventory: complete, description, type, location, to remain on site.

Response: There are no hazardous substances or wastes that remain on the leasehold site.

Item 10.C. Spill/Discharge: detailed, description, identification on site map, remedial action taken C.SPCC plan.

Response: 10. There have been no known spills or discharges of hazardous substances or wastes within the leasehold property.

C. Presently, there are three, empty above ground, steel No. 2 fuel oil tanks on concrete pads or on a concrete floor within the leasehold area. No SPCC plan is required at the present time.

Item 11a. Sampling Plan

Response: No sampling is proposed for the site. All hazardous substances associated with past facility operations are being handled and removed in an appropriate manner. No hazardous substances or wastes will remain on the leasehold site.

We trust that this information adequately satisfies the Bureau's request. If you have any questions or require additional information, please do not hesitate to call.

Very truly yours,

FIRST ENVIRONMENT, INC.

Steven D. Caretsky
Vice President

SDC/bg

cc: Christopher Doyle, V.P., Guyon General Piping, Inc.
Sunil K. Garg, Esq., Counsel to Guyon

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FIRST ENVIRONMENT

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ATTACHMENT 1

AREA 11: DARKROOM INVENTORY*

NO OF CONTAINERS	CONTAINER SIZE	SUBSTANCE IDENTIFICATION
(3)	1-gal	Weld Aid WeldKleen Antispatter
(2)	1-qt	Ideal DO White ES1751 - Machine Stencil Product
(6)		12-oz Krylon Spray Paint
(1)		8-oz Unlabelled Spray Can
(1)		1-gal Canolite Vinyl Acrylic Latex
(1)	12-oz	Ultragel II Ultrasonic Coolant
(2)	1-gal	MT Paint Jars - Plastic
(1)	14-oz	USK Radelin Cleaner
(1)	652-g	Kodak Developer System Cleaner
(1)	15-oz	Dyna Flux Crack Check Cleaner C-NF
(1)	1-lb	Kodak Hypo Clearing Agent
1-box		Kodak Industrex M Film M-5 100 sheets 4 1/2" x 10"
1-box		Kodak Industrex AA-5 Film 125 sheets 14" x 17" MT
(1)	5-gal	KB Aerotech Exonsen No. 20
(1)	1-gal	Spotchek Penetrant SKL-HF/SKL-S
(1)	1/2-gal	Glycerine
(3)	200-ml	Speedry Metal Marker
(1)	14-oz	White Lithium #2 Grease
(1)	1-qt	United Rust Ripper 517
(14)	1-pt	Kodak Indicator Stop Bath
(6)	1-pt	Kodak Photo-Flo 200
(24)	200-ml	Kodak Liquid X-Ray Developer and Replenisher Sol B
(4)	2-gal	Kodak Liquid X-Ray Developer and Replenisher Sol A
(6)	18-oz	Kodak Hardener Solution B
(6)	2-gal	Kodak Rapid Fixer A
(2)	3-gal	Kodak Industrex Fixer and Replenisher
(6)	1-pt	Oakite 56 Industrial Solvent

* All materials removed and disposed off-site.

f:2952a

ATTACHMENT 2

AREA 12: PAINT STORAGE INVENTORY*

NO OF CONTAINERS	CONTAINER SIZE	SUBSTANCE IDENTIFICATION
(4)	5 gal.	Galva Kote Gray Protector
(2)	5 gal.	Panorama Coating
(2)	1 gal.	Tank Epoxy
(4)	1 gal.	Metal Primer
(3)	1 gal.	Red Primer
(1)	1 gal.	Red Safety Paint
(1)	1 gal.	Grey Deck Enamel
(4)	1 gal.	Eplon Component A
(4)	1 gal.	Eplon Reactor B
(4)	1 gal.	Cold Set Coating
(4)	Tins	Catalyst
(4)	1 gal.	Part B Inorganic Zinc Protector
(4)	1 gal.	Hi Gloss Machinery Enamel
(3)	1 gal.	Fabcoat Primer
(3)	1 gal.	Fabcoat Protective Coating
(6)	1 gal.	Heatflex Enamel
(3)	1 gal.	Epoxy Chem Resistant Enamel
(2)	1 gal.	Epoxy Enamel
(35)	1 gal.	Zinc Chromate Primer
(70)	1 gal.	Zinc Paint Self Cure
(1)	5 gal.	Zinc Paint Self Cure
(4)	5 gal.	Kromik Metal Primer
(2)	5 gal.	Bitumastic Protect Coating
(30)	Boxes	Demoist
(2)	5 gal.	Enamel
(7)	Cases	Enamels (4-1 gal.)
(6)	1 gal.	Thinner
(3)	1 gal.	Zinc Filler
(6)	5 gal.	Enamel
(36)	5 gal.	Enamels (Protective Coatings)
(2)	5 gal.	Carbomastic Epoxy (2-1 gal.)
(6)	1 pt.	Hardener
(1)	1 gal.	Thinner
(2)	1 gal.	Rust Inhibitor
(1)	1 gal.	Epoxy Converter
(1)	1 gal.	Epoxline
(1)	1 gal.	Enamel
(4)	1 gal.	Mobile High Build Epoxy
(6)	1 gal.	Devo-High Heat Coating
(1)	1 gal.	1212 Aluminum
(4)	1 gal.	Brushing Lacquer
(2)	1 gal.	Protect on Metal
(2)	1 gal.	Rust Ban
(1)	1 gal.	Rust Ban 6237
(1)	1 gal.	Rust Ban AK6289-1
(26)	1 gal.	Devcon Z
(4)	1 gal.	Vinyl Acrylic Latex Flat

f:2952a

ATTACHMENT 2 (Continued)

NO OF CONTAINERS	CONTAINER SIZE	SUBSTANCE IDENTIFICATION
(1)	1 gal.	Latex Flat Paint
(2)	1 gal.	Oxide Primer
(2)	1 gal.	Floor & Deck Enamel
(6)	1 gal.	20x Epoxy
(2)	1 gal.	Epoxy - Polymide Coating
(8)	1 gal.	C & M Hi-Bild Primer
(7)	5 gal.	201 Epoxy
(7)	5 gal.	Pug Primer
(1)	5 gal.	Industrial Primer
(1)	5 gal.	Chemical Coating
(1)	5 gal.	Buff primer Red
(1)	5 gal.	Read lead Paint
(3)	5 gal.	Industrial Primers & Finishes
(1)	5 gal.	Chemical & Moisture Resisting Enamel
(2)	5 gal.	Galvonoxi
(2)	5 gal.	Red Lead Primer
(17)	1 gal.	Rust Oleum
(1)	1 gal.	Carboline Zinc Filler
(1)	1 gal	Epoxy Enamel
(1)	5 gal.	Inorganic Zinc Protective Coating
(1)	5 gal.	Bitumastic No. 300-M
(1)	5 gal.	Dar Gray Silicone - Acrylic Finish
(1)	5 gal.	Gray Primer
(2)	5 gal.	Green primer
(1)	5 gal.	Yellow Primer
(1)	5 gal.	Galvakote Gray
(5)	5 gal.	Enamel
(4)	5 gal.	Thinner
(3)	5 gal.	Lead Primer Paint
(1)	5 gal.	Rust Guard Primer
(2)	5 gal.	Industrial Paint Finish

* All materials removed and disposed off-site.

f:2952a

Client: SCHNCOM

Address: PARK 80 WEST, PLAZA TWO, SUITE 200, SADDLE BROOK, NJ 07662

Project No.: GUYON GENERAL PIPING Contact: LISA KAPLAN

Veritech Lab No.: 5660

VERITECH LABORATORY REPORT

47 CAREY AVENUE
BUTLER, NJ 07405
(201) 492-8744

Date Received: 11/7/89 Received By: SG

Date Completed: 11/23/89 COC: YES

Date Reported: 11/22/89 NJDEP Laboratory No. 14622

Invoice No.: Invoice To: SAME

COURIER CHARGE: NO

sand blast grit

Sample Matrix: Soil( ) Water( ) Waste(X)

Deliverables: Results Only(X) Tier II( )

This report is a true report of results obtained from our tests of this material. In lieu of a formal contract document, the total aggregate liability of Veritech to all parties shall not exceed Veritech's total fee for analytical services rendered.

Stanley Gryewicz
Laboratory Manager

876970151

Client: ECRACOM

Address: PARK 80 WEST, PLAZA TWO, SUITE 200, SADDLE BROOK, NJ 07662

Project No.: JUYON GENERAL PIPING Contact: LISA KAPLAN

Veritech Lab No.: 5660

SAMPLE NO.	SAND BLASTING GRIT	
LAB NO.	5660	
TEST 601 SCAN		MDL
BROMODICHLOROMETHANE	ND	10
BROMOFORM	ND	10
BROMOMETHANE	ND	10
CARBON TETRACHLORIDE	ND	10
CHLOROBENZENE	ND	10
CHLOROETHANE	ND	10
2-CHLOROETHYLVINYL ETHER	ND	10
CHLOROFORM	ND	10
CHLOROMETHANE	ND	10
DIBROMOCHLOROMETHANE	ND	10
1,2-DICHLOROBENZENE	ND	10
1,3-DICHLOROBENZENE	ND	10
1,4-DICHLOROBENZENE	ND	10
DICHLORODIFLUOROMETHANE	ND	10
1,1-DICHLOROETHANE	ND	10
1,2-DICHLOROETHANE	ND	10
1,1-DICHLOROETHENE	ND	10
TRANS-1,2-DICHLOROETHENE	ND	10
1,2-DICHLOROPROPANE	ND	10
CIS-1,3-DICHLOROPROPENE	ND	10
TRANS-1,3-DICHLOROPROPENE	ND	10
METHYLENE CHLORIDE	BMDL	10
1,1,2,2-TETRACHLOROETHANE	ND	10
TETRACHLOROETHENE	ND	10
1,1,1-TRICHLOROETHANE	ND	10
1,1,2-TRICHLOROETHANE	ND	10
TRICHLOROETHENE	ND	10
TRICHLOROFLUOROMETHANE	ND	10
VINYL CHLORIDE	ND	10

All Concentrations Reported As: PPM
BMDL = Compound Present But Below Method Detection Limit
MDL = Method Detection Limit
ND = Not Detected Above MDL
NA = Not Applicable

Client: ECRACOM

Address: PARK 80 WEST, PLAZA TWO, SUITE 200, SADDLE BROOK, NJ 07662

Project No.: GUYON GENERAL PIPING Contact: LISA KAPLAN

Veritech Lab No.: 5660

SAMPLE NO.	SAND BLASTING GRIT	
LAB NO.	5660	
[illegible]PCB SCAN		MDL
PCB-1016	ND	0.5
PCB-1221	ND	0.5
PCB-1232	ND	0.5
PCB-1242	ND	0.5
PCB-1248	ND	0.5
PCB-1254	1.0	0.5
PCB-1260	ND	0.5

All Concentrations Reported As: ppm
MDL = Method Detection Limit
ND = Not Detected Above MDL
NA = Not Applicable

876970153

Client: ECRACOM

Address: PARK 80 WEST, PLAZA TWO, SUITE 200, SADDLE BROOK, NJ 07662

Project No.: GUYON GENERAL PIPING Contact: LISA KAPLAN

Veritech Lab No.: 3660

SAMPLE NO.		SAND BLASTING GRIT
LAB NO.	MDL	3660
TEST		
TOTAL PHENOLS	0.03	1.9
TOTAL CYANIDE	0.04	ND
% [illegible]	NA	96

All Concentrations Reported As: ppm (EXCEPT WHERE NOTED)
MDL = Method Detection Limit
ND = Not Detected Above MDL
NA = Not Applicable

876970154

Client: ECRACOM

Address: PARK 80 WEST, PLAZA TWO, SUITE 200, SADDLE BROOK, NJ 0766

Project No.: GUYON GENERAL PIPING Contact: LISA KAPLAN

Veritech Lab No.: 5660

SAMPLE NO.		SAND BLASTING GRIT
LAB NO.	MDL	5660
TEST		
EP-TOX		
As	0.001	0.007
Ba	1.2	ND
Cd	0.03	0.03
Cr	0.1	ND
Pb	0.2	ND
Hg	0.0005	0.0007
Se	0.002	ND
Ag	0.04	ND
Ni	0.07	0.3
FLUORIDE	1.0	ND
CYANIDE (REACTIVE)	0.09	ND
SULFIDE (REACTIVE)	2	[illegible]
IGNITABILITY	NA	NOT IGNITABLE
TPH	10	104.
CORROSIVITY (pH)	NA	9.8

All Concentrations Reported As: ppm
MDL = Method Detection Limit
ND = Not Detected Above MDL
NA = Not Applicable

876970155

ATTACHMENT 4

AREA 20: FORMER PAINT SHOP INVENTORY*

NO OF CONTAINERS	CONTAINER SIZE	SUBSTANCE IDENTIFICATION
(8)	5 gal.	Coal Tar Epoxy
(3)	5 gal.	Carbomastic Part A
(3)	5 gal.	Carbomastic Part B
(1)	5 gal.	Thinner #4
(4)	5 gal.	Carbo Zinc Base
(4)	2 gal.	Part B Epoxy
(1)	5 gal.	Enamel Corrosion Proof
(1)	5 gal.	Enamel
(2)	5 gal.	Aluminum/Silicone Primer
(1)	5 gal.	Tectyl Rust Preservative
(2)	5 gal.	Enamels
(2)	1 gal.	Cold Set Coatings
(2)	5 gal.	Red Lead Primer
(2)	5 gal.	Gray/Red Primer
(3)	55 gal.	Hydraulic Oil
(1)	15 gal.	Tectyl Rust Preservative
(1)	55 gal.	Halogen Free Solvent
(1)	55 gal.	Cleaner Concentrate
(1)	1 gal.	Polyurethane Enamel
(1)	1 gal.	Hi-Build Epoxylin
(1)	1 gal.	G.E. Hardener
(1)	1 gal.	Keystone Lubricants
(1)	1 gal.	Thinning Oil
(2)	1 gal.	Epoxy Thinner
(1)	5 gal.	Enamel
(4)	1 gal.	Epoxy Compound
(1)	5 gal.	Amercoat Aliphatic Polyurethane
(1)	5 gal.	Thinner
(2)	5 gal.	Rust Preventative Fluid - Tri - Aryl Phosphate
(3)	1/2 gal.	Carbo Zinc - 11 gram
(8)	1 gal.	294 Epoxy Primer
(1)	1 gal.	Inorganic Primer
(2)	1 gal.	29 Epoxy Primer
(3)	1 gal.	Green Paint - with Toluol, Xylol, Ketone & Alcohol Solvent
(1)	1 gal.	Epoxy Polyamide Coating
(3)	1 gal.	High Gloss Machinery Enamel
(1)	1 gal.	Red Lead Primer Paint
(2)	1 gal.	Metal Primer
(1)	1 gal.	Inorganic Zinc
(2)	1 gal.	Rust Inhibitive Paint
(1)	1 gal.	Protective Coating - Epoxy Primer
(1)	1 gal.	Paint Thinner
(1)	1 gal.	Epoxy Enamel
(1)	1 gal.	Carboline Zinc Filler

* All materials removed and disposed off-site.

f:2952a

State of New Jersey
DEPARTMENT OF ENVIRONMENTAL PROTECTION
DIVISION OF HAZARDOUS WASTE MANAGEMENT
CN 028
Trenton, N.J. 08625-0028
(609) 633-7141
Fax # (609) 633-1454

APR 2 0 1994

CERTIFIED MAIL
RETURN RECEIPT REQUESTED

Sunil K. Garg
Lowenstein, Sandler, Kohl, Fisher & Boylan
65 Livingston Avenue
Roseland, NJ 07068

Dear Mr. Garg:

RE: Inspection Results, ECRA Case #88800
Fabco Piping, Inc.
Harrison Town, Hudson County

As part of the Environmental Cleanup Responsibility Act review process, the referenced Industrial Establishment was inspected by a representative of this Bureau as indicated in the enclosed Report of Inspection.

Please provide us with the information noted and/or take actions prescribed; our continued work on this project will be dependent upon your compliance with the enclosed requirements. Documentation to verify the completion of required actions must be provided as proof of such compliance and a full description of quantities and costs of any and all removal and disposal activities must be detailed.

This document was prepared by the Case Manager, Heather Swartz. Any questions you may have regarding the report should be directed to the Case Manager at (609) 633-7141.

Sincerely,

Stephen E. Maybury, Supervisor
Bureau of Environmental Evaluation
and Cleanup Responsibility Assessment

enclosure

BB000001

Industrial Site Evaluation Element
Bureau of Environmental Evaluation
and Cleanup Responsibility Assessment

Environmental Cleanup Responsibility Act

Report of Inspection

ECRA Case #88800 Date of Inspection: 3/22/90
Inspection Category: Preliminary
Inspector: Heather Swartz

Industrial Establishment: Fabco Piping, Inc.
100 South Fourth Street
Harrison Town, Hudson County

Individuals Involved: Christopher Doyle, Guyon Piping
Sunil Garg, attorney
Steven Caretsky, First Environment
Jake Nemergut, First Environment

NARRATIVE DESCRIPTION

I arrived at 11:00 am. Conditions were cool and sunny. Mr. Garg guided the tour of the Fabco Piping, Inc. leasehold, which consisted of process areas, storage areas and office space. During the course of the site inspection Mr. Caretsky and Mr. Nemergut summarized the remediation and post-excavation sampling that First Environment had undertaken "at peril" in several areas of stained soil. Afterwards the above referenced individuals and I discussed further requirements for ECRA compliance. I departed at 1:15 pm.

DEFICIENCIES NOTED

1. Several transformers were noted inside a fenced area beside the garage. There was no staining of the soil beneath the transformers. The owners and PCB content of the transformers were unknown on the day of inspection.

2. Small quantities of hazardous materials in the form of cleaning substances (mostly phenols) were being temporarily stored near the entrance to the main building on the day of the inspection.

ACTIONS REQUIRED ON THE PART OF THE APPLICANT

1. Fabco Piping, Inc. shall submit to the Department documentation from the public utilities company regarding the ownership and PCB content of the transformers at the site.

2. Fabco Piping, Inc. shall remove and/or dispose of the hazardous materials stored near the entrance to the main building, and submit documentation to the Department that this was completed.

3. Fabco Piping, Inc. shall submit the results of all "at peril" sampling that was conducted at the site. The sampling results shall be accompanied by either a revised Sampling, Cleanup Plan, or Negative Declaration and the appropriate review fee(s) pursuant to N.J.A.C. 7:26B.

4. Fabco Piping, Inc. shall submit disposal documentation for the excavated soil and sandblast grit that was removed from the site.

5. Fabco Piping, Inc. shall submit documentation of clean fill used to back fill the excavation at the site.

6. Fabco Piping, Inc. shall address the above requirements and submit the documentation and sampling results accompanied by appropriate follow up proposals to the Department within 30 days of receipt of this letter

ACTIONS REQUIRED ON THE PART OF BEECRA

1. None.

Inspector/Case Manager Signature _____

Approved: _____, Supervisor
Bureau of Environmental Evaluation
and Cleanup Responsibility Assessment

876970159

FIRST ENVIRONMENT

90 Riverdale Road
Riverdale, New Jersey 07457
(201) 616-9700 • FAX (201) 616-1930

Telecopy

May 25, 1990

Ms. Heather Swartz
Case Manager
State of New Jersey Department of
Environmental Protection
Division of Hazardous Waste Management
CN028
401 East State Street
Trenton, New Jersey 08625-0028

Re: Remediation/Decommissioning Results
Fabco Piping, Inc.
1000 South Fourth Street
Harrison, New Jersey 07029
ECRA Case No. 88800

Dear Ms. Swartz:

Please find enclosed, three copies of our report entitled "Remediation/Decommissioning Results" for the above-referenced facility. The report responds to the items presented in your letter dated April 20, 1990, on the report of inspection of Fabco Piping, Inc. We have telecopied the text and soil sampling results on this date. At the same time we have forwarded to your office complete documents via Federal Express.

We note that shipment of the soils excavated from the railroad tanks and sediments from the concrete floor of the lean-to, as well as the small quantities of hazardous materials near the entrance to the former machine shop, is scheduled for the week of May 29, 1990. Upon receipt of the manifests, copies of the manifests will be forwarded to your office.

BBC000032

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876970160

We trust that this information adequately addresses the items mentioned in your letter. If you have any questions or require additional information, please do not hesitate to call.

Very truly yours,

FIRST ENVIRONMENT, INC.

Jake Nemergut

Jake Nemergut
Senior Enviromental Scientist

JN/bg

cc: C. Doyle, V.P. Guyon General Piping, Inc.
S. Garg, Esq., Counsel to Guyon
S. D. Caretsky

5/90

CONTENTS

CONTENTS (Continued)

FIGURES

LIST OF TABLES

EXECUTIVE SUMMARY

Comprehensive site investigation, remediation, and decontamination/decommissioning activities including soil sampling, soil excavation and disposal, and the proper disposal of hazardous wastes/materials/substances left in place by the leaseholder, Fabco Piping, Inc., have been completed. These activities, performed in response to requirements of the Environmental Cleanup Responsibility Act (ECRA), have confirmed that any potential sources of environmental concern related to leaseholder activities have been addressed and remediated, where necessary. No sources of environmental concern remain at the Fabco leasehold.

INTRODUCTION

This report constitutes the responses prepared by First Environment on behalf of Guyon General Piping, Inc. (Guyon), the property owner of the facility which is the subject of ECRA Case No. 88800, to the ECRA Inspection Results summarized in a letter dated April 20, 1990, by NJDEP to Fabco Piping, Inc. Fabco was a tenant of Guyon at the subject property. Since Fabco did not respond to the NJDEP's request to complete its ECRA obligations, Guyon as property owner, at the request of the NJDEP, has undertaken the activities, and provided responses, necessary to complete Fabco's ECRA compliance obligations. Guyon is now responding to the action items identified in the Report of Inspection.

TECHNICAL OVERVIEW

First Environment, Inc. (First Environment) has conducted site investigation, remediation and decontamination/decommissioning activities in response to the Environmental Cleanup Responsibility Act (ECRA) at the Fabco Piping, Inc. leasehold in Harrison, New Jersey. Investigation, remediation and decontamination/decommissioning activities included the collection of soil samples, excavation and disposal of contaminated soils, and the transport and disposal of containerized hazardous wastes/materials/substances. The following areas of potential environmental concern were addressed and are shown on Figure 1:

- o Exterior of Paint Shop
  - Excavation and disposal of contaminated soils
  - Collection and analysis of post excavation samples
  - Restoration of area with certified clean fill
- o Railroad Tracks
  - Excavation and disposal of stained soils
- o Concrete Floor of Lean-To
  - Removal of stained sediments from floor
  - Disposal of stained sediments
- o Transformers
  - Confirmation from PSE&G of less than 50 ppm of PCBs
- o Sand Blast Grit
  - Disposal of sand blast grit

- Building Decommissioning

  - Field identification
  - Consolidation
  - Transportation and disposal

FINDINGS

GENERAL

The results of the site investigation decontamination/ decommissioning and soils remediation activities undertaken at the Fabco Piping, Inc. leasehold facility in Harrison, New Jersey, are discussed below.

Detailed descriptions of the activities performed for each area of concern, including sample collection, analytical results, and off-site disposal are presented below.

EXTERIOR OF PAINT SHOP

The exterior portion of the southeast side of the Paint Shop was identified as a potential area of environmental concern due to the presence of empty containers and wood pallets observed in this area. To evaluate the condition of the soils in this area, soil samples were collected on February 13, 1989.

SAMPLE COLLECTION - SITE INVESTIGATION ACTIVITIES

Samples collected at S-1, S-2, and S-3 were submitted to ICM Laboratories (ICM) for analysis. The sample locations are illustrated on Figure 1. Samples collected at 18 to 24 inches below ground surface were analyzed for volatile organic compounds plus 15 peaks, while samples collected at 0 to 6 inches below ground surface were analyzed for priority pollutant metals.

ANALYTICAL RESULTS - SITE INVESTIGATION ACTIVITIES

The analytical results revealed that all volatile organic compounds were either undetected or present at concentrations significantly below current ECRA guidelines.

Arsenic, cadmium, chromium, copper, mercury, nickel, selenium, and zinc were detected at one or more sample locations at concentrations above current ECRA guidelines. Arsenic was detected at S-1 (24.5 ppm), S-2 (24.2 ppm) and S-3 (41.7 ppm). Cadmium was detected at S-1 (7.98 ppm), S-2 (8.35 ppm) and S-3 (16.3 ppm). Chromium was detected at S-1 (437 ppm), S-2 (142 ppm) and S-3 (166 ppm). Copper was detected at S-1 (392 ppm), S-2 (239 ppm) and S-3 (324 ppm). Mercury was detected above ECRA guidelines only at S-3 at a concentration of 2.05 ppm. Nickel was detected at S-1, S-2, and S-3 at concentrations of 1,530 ppm, 235 ppm, and 264 ppm, respectively. Selenium was found above current ECRA guidelines only at S-3 at a concentration of 5.54 ppm. Zinc was detected at S-1 (1,190 ppm), S-2 (415 ppm) and S-3 (1,110 ppm). A summary of the analytical results is provided in Table 1. Complete laboratory reports including Tier II deliverables are provided in Appendix A.

Based on the analytical results from the site investigation activities, soil remediation activities were undertaken. On March 2, 1990, approximately 69.88 tons of contaminated soil were excavated and stockpiled on-site. At the completion of the excavation activities, post excavation samples were collected. The area was backfilled with certified clean fill. 2½' to 18' ave. 22'.

POST EXCAVATION SAMPLE COLLECTION

To determine the environmental quality of the remaining soil, three post excavation samples, S-201, S-202, and S-203, were collected on March 2, 1990, as illustrated in Figure 2. The samples were taken at 0-6" below the excavation or at approximately 16-22" below the original ground surface. A duplicate sample was collected at location S-201. All soil samples were submitted to ICM for analysis for priority pollutant metals.

TABLE 1

SUMMARY OF ANALYTICAL RESULTS - SOIL SAMPLES
EXTERIOR OF PAINT SHOP

SAMPLE LOCATION		S-1	S-1	S-2	S-2	S-3	S-3	DUP (S-3)	DUP (S-3)	FIELD	TRIP
SAMPLE DEPTH	ECRA	0-6"	18-24"	0-6"	18-24"	0-6"	18-24"	0-6"	18 24"	BLANK	BLANK
SAMPLE DATE	GUIDELINES	02/13/89	02/13/89	02/13/89	02/13/89	02/13/89	02/13/89	12/13/89	12/13/89	02/13/89	02/13/89
Volatile Organics (ppb)	1,000										
Targeted Compounds[1]		--	u	--	50	--	u	--	u	u	u
Chloroform		--	u	--	3	--	u	--	u	u	u
Trichloroethylene		--	u	--	50	--	u	--	u	u	u
Non-Targeted Peaks[2]		--	u	--	u	--	u	--	u	u	u
Priority Pollutant Metals (ppm)											
Antimony	10	3.29	--	2.74	--	3.84	--	5.44	--	u	
Arsenic	20	24.5	--	24.2	--	41.7	--	28.8	--	u	
Beryllium	1	u	--	u	--	u	--	u	--	u	
Cadmium	3	7.98	--	8.35	--	16.3	--	9.17	--	u	
Chromium	100	437	--	142	--	166	--	136	--	u	
Copper	170	392	--	239	--	324	--	364	--	u	
Lead	250-1000	809	--	525	--	991	--	828	--	u	
Mercury	1	0.511	--	0.980	--	2.85	--	0.880	--	u	
Nickel	100	1530	--	235	--	264	--	237	--	u	
Selenium	4	2.37	--	2.49	--	5.54	--	3.06	--	u	
Silver	5	u	--	u	--	u	--	u	--	u	
Thallium	5	u	--	u	--	u	--	u	--	u	
Zinc	350	1190	--	415	--	1110	--	909	--	u	

u = Undetected
* = Estimated value, below detection limit
-- = Not analyzed
(1) = Does not include estimated values
(2) = Estimated concentration of tentatively identified compounds
NOTE: Analytes found in both the sample and laboratory blank indicate laboratory caused contamination and therefore are not included in this table.

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8769701?1

ANALYTICAL RESULTS - POST EXCAVATION SAMPLES

Laboratory analysis of samples S-201 through S-203 showed that beryllium, cadmium, chromium, selenium, and thallium were undetected or below ECRA guidelines at all sample locations. Antimony ranged from undetected at S-201 to 79.3 parts per million (ppm) at S-203. Arsenic levels ranged from 26.4 ppm in the duplicate of sample location S-201 to 40.1 ppm at S-202. Two of the copper values were below ECRA guidelines and two were above ECRA guidelines, 432 ppm and 401 ppm, at S-202 and S-203, respectively. Similarly two of the analysis for lead were below ECRA guidelines and two (S-202 and S-203) were above ECRA guidelines at 3710 ppm and 3330 ppm, respectively. The levels of mercury were 0.595 ppm at S-201, 9.13 ppm at S-202, 10.2 ppm at S-203 and 7.77 ppm in the duplicate of S-201. For nickel, 3 of the values were below ECRA guidelines and one, the duplicate of S-201 was 141 ppm. For silver, S-202 was 6.57 ppm and S-203 at 10.7 ppm. Silver content in the duplicate was undetected and 0.930 ppm in sample S-201. Zinc levels were 77.5 ppm at S-201, 904 ppm at S-202, 1020 ppm at S-203 and 314 ppm in the duplicate sample.

The post excavation soil sample results are summarized in Table 2 and illustrated on Figure 2. Complete laboratory reports including Tier II deliverables are provided in Appendix A.

The material was shipped to the Clean America facility in Baltimore, Maryland on May 14, 1990 as a non-hazardous waste. Waste classification analyses and disposal documentation for the excavated soil are presented in Appendix B. The Clean Fill Certification is presented in Appendix C.

Based on the historical use of the property, immobility of the metals detected, presence of "urban fill" throughout the site, and minimal risk of public exposure to these soils, no further investigation or remediation is recommended.

TABLE 2

SUMMARY OF ANALYTICAL RESULTS - POST EXCAVATION SOIL SAMPLES
EXTERIOR OF PAINT SHOP

SAMPLE LOCATION SAMPLE DEPTH SAMPLE DATE	ECRA GUIDELINES	S-201 0-6" BELOW EXCAVATION 03/02/90	S-202 0-6" BELOW EXCAVATION 03/02/90	S-203 0-6" BELOW EXCAVATION 03/02/90	DUPLICATE (S-201) 0-6" BELOW EXCAVATION 03/02/90	FIELD BLANK 03/02/90	TRIP BLANK 03/02/90
Volatile Organics (ppb)	1,000						
Targeted Compounds(1)		--	--	--	--		
Chloroform		--	--	--	--	--	--
Trichloroethylene		--	--	--	--		
Non-Targeted Peaks(2)		--	--	--	--		
Priority Pollutant Metals (ppm)							
Antimony	10	u	30.9	79.3	2.63	u	u
Arsenic	20	35.2	40.1	33.8	26.4	u	u
Beryllium	1	0.372	0.536	0.509	0.777	u	u
Cadmium	3	u	1.46	1.75	0.837	u	u
Chromium	100	28.0	35.5	31.8	98.6	u	u
Copper	170	148	432	401	156	u	u
Lead	250-1000	277	5710	3330	326	u	u
Mercury	1	0.595	9.13	10.2	7.77	u	u
Nickel	100	46.9	40.1	39.7	141	u	u
Selenium	4	2.42	2.99	2.69	1.14	u	u
Silver	5	0.930	6.59	10.7	u	u	u
Thallium	5	0.434	0.460	0.364	0.478	u	u
Zinc	350	77.5	904	1020	314	u	u

u = Undetected
* = Estimated value, below detection limit
-- = Not analyzed
(1) = Does not include estimated values
(2) = Estimated concentration of tentatively ident
NOTE: Analytes found in both the sample and laboreused contamination and therefore are not included in this table.

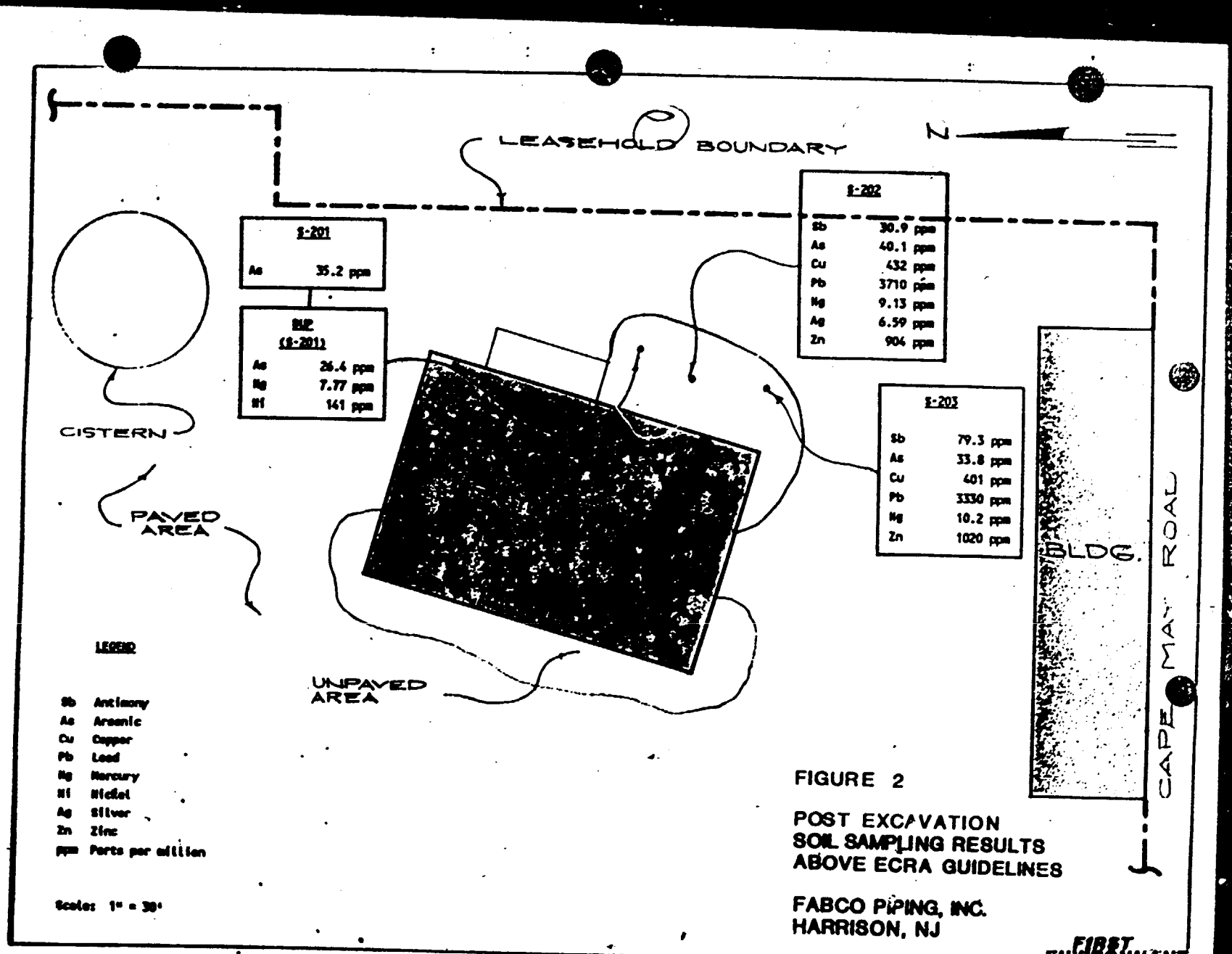

FIGURE 2

POST EXCAVATION
SOIL SAMPLING RESULTS
ABOVE ECRA GUIDELINES

FABCO PIPING, INC.
HARRISON, NJ

FIRST ENVIRONMENT

RAILROAD TRACKS

A small section of the railroad siding which runs through the Fabco leasehold portion of the site was identified as a potential area of environmental concern due to the presence of stained soil and asphalt pavement. The railroad ties along the siding are covered with asphalt paving. However, the paving in an area approximately 8 feet wide by 15 feet long was found to be in a deteriorated condition and staining was observed in soils between the tracks.

To remediate this area, the stained soils/macadam between the railroad ties was excavated on March 2, 1990. The excavation extended to a depth of approximately 16 inches and resulted in the removal of approximately 2 cubic yards of stained soil/macadam. The excavated soils were stockpiled on-site, sampled, and analyzed for waste classification. The excavation was backfilled with clean fill. A copy of the Clean Fill Certification is provided in Appendix C. The stockpiled soils will be transported to Chem-Met Services for disposal as a hazardous waste, which is due to the presence of 12.8 ppm of EP Tox lead. Copies of the waste classification analyses are included in Appendix D. Copies of the waste manifest will be forwarded to NJDEP upon receipt.

The purpose of the excavation was to remove visually stained soils. All visually stained soils were excavated. Post excavation soil samples were not collected for laboratory analysis. Based on the age of the facility and railroad siding the collection and analysis of soil samples from the railbed would not reveal results representative of the potential impacts of surface staining.

CONCRETE FLOOR OF LEAN-TO

An above ground No. 2 fuel oil tank was located on a concrete pad in a lean-to structure at the north end of the annealing and bending operations. The lean-to was also used to store dry materials such as metal scaffolding. This area was identified as a potential area of environmental concern due to the presence of stained sediments. The concrete floor was in good condition and the stained sediments were confined to the concrete surface.

To remediate this area, the stained sediments were removed from the concrete pad on March 2, 1990. The stained sediments, approximately 0.25 cubic yards were stockpiled on-site with the soils excavated from the railroad tracks, sampled, and analyzed for waste classification. The stockpiled soils will be transported to Chem-Met Services for disposal as a hazardous waste which is due to the presence of 12.8 ppm EP Tox lead. Copies of the waste classification analyses are included in Appendix D. Copies of the waste manifest will be forwarded to the NJDEP upon receipt.

TRANSFORMERS

Three Public Service Electric and Gas Company (PSE&G) transformers located along the east side of the paint shop, contain less than 50 ppm of polychlorinated biphenyls (PCBs). A PSE&G letter concluding less than 50 ppm PCB content and dated April 3, 1990, can be found in Appendix E.

SAND BLAST GRIT

A sandblasting operation was located in a building, situated at the southwest corner of the leasehold property. Steel pipe was sandblasted in the building to remove rust and scale prior to

fabrication. To determine the potential contaminants in the sandblast grit, samples were collected, composited, and submitted for laboratory analysis.

SAMPLE COLLECTION

On February 13, 1989, samples of the sandblast grit were collected. A composite sample, representative of the sandblast grit to be disposed of was submitted to ICN Laboratories for analysis. The composite sample was analyzed for the presence of PCBs, E.P. Tox Metals, cyanide, sulfide, and petroleum hydrocarbons.

ANALYTICAL RESULTS

The analytical results revealed no detectable concentrations of PCBs, E.P. Tox Metals, cyanide, or sulfide. Petroleum hydrocarbons were detected at a concentration of 2,400 ppm.

To facilitate the decommissioning of the Fabco leasehold the sandblast grit was scraped up on October 31, 1989 and November 1, 1989 and stockpiled on-site pending waste classification analyses. Analyses indicated that the sand blast grit was non-hazardous. The stockpiled soil was transported off-site for disposal at Breitenstine Landfill in Waynesburg, Ohio on December 11 and 12, 1990. Copies of the waste classification analyses and non-hazardous waste manifests are included in Appendix F.

BUILDING DECOMMISSIONING

The Site Evaluation Submission (SES) submitted to the Department on February 22, 1990 included a comprehensive inventory of the hazardous wastes/materials/substances identified within the leasehold property. The materials listed in the inventory have been properly disposed. The waste manifests are provided in Appendix G.

During the ECRA site inspection, a small quantity of containerized materials which were staged for disposal pending waste classification were observed near the entrance to the former Machine Shop. These materials have been classified and will be transported off-site for disposal upon receipt of the approval from the disposal facility.

CONCLUSIONS AND RECOMMENDATIONS

The conclusions and recommendations for each area of environmental concern are addressed below on an area-by-area basis.

EXTERIOR OF PAINT SHOP

The analytical results from the post excavation soil sampling have revealed the presence of priority pollutant metals at concentrations above current ECRA guidelines in the remaining soils. However, these findings are not significant due to the extensive historical use of this site for heavy industrial operations. Furthermore, the results from the EP Toxicity testing performed on the excavated soils as shown in Appendix B-1, clearly demonstrate that the metals detected are immobile.

Based on the historical use of the property, immobility of the metals detected, presence of "urban fill" throughout the site, and minimal risk of public exposure to these soils we recommend that no further investigation or remediation of this area be performed. We also recommend that the remediation of this area be considered complete by the Department with regard to ECRA compliance at this site.

RAILROAD TRACKS

The removal of stained soils/macadam from the railbed has been successfully completed. Based on the removal of the surficially stained soils/macadam from this area no further investigation or remediation of this area is proposed.

CONCRETE FLOOR OF LEAN-TO

The removal and disposal of stained sediments from the concrete floor of the lean-to has resulted in the successful

decontamination/decommissioning of this area. The good condition of the concrete floor contained any contaminated sediments. Based on the work completed, no additional decontamination/decommissioning of this area is proposed.

TRANSFORMERS

Documentation provided by PSE&G indicates that there are less than 50 ppm of PCBs in the transformers. Based on this information and the lack of any visual evidence of staining in the transformer area, no investigation or remediation is warranted.

SAND BLAST GRIT

The removal and disposal of the sandblast grit from the sandblast building area has resulted in the successful decontamination/ decommissioning of this area as the sand blast grit was disposed as a non-hazardous material. Based on the work completed, no additional decontamination/decommissioning of this area is proposed.

BUILDING DECOMMISSIONING

The removal and disposal of the hazardous materials/substances from the building has resulted in the successful decontamination/decommissioning of this area. Based upon the removal and disposal of the materials from the building, no additional decontamination/decommissioning of this area is proposed.

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152 Route 10
andolph, NJ 07869
201-584-0330
ARCH 28, 1989

NJ DEP Certified Drinking Water/Wastewater
Laboratory ID# 14116
US EPA Contract Laboratory

LABORATORY ANALYSIS

Lab Number: 98096
Client: FIRST ENVIRONMENT
ample Source: FABCO - HARRISON, N.J.
ample ID: S-1 0-6"
Sampled by: S.S./J.V.
ample Date: 02/13/89
t\Lab Date: 02/13/89
Matrix: SOIL

esults in mg/kg dry weight basis.

Parameter	Sample Result	Dupl. Result	RPD	Dupl. Contr. Limits (RPD)	Spike Added	Spike Sample Result	Spike Recovery %	Spike Contr. Limits %	Min. Det. Limit	Meth. Sig. Anal.
Antimony	3.29	2.81	16	+-43					1.92	U
Arsenic	24.5	22.9	7	+-20					1.05	U
Beryllium	U	U	NC	NC					0.773	U
Cadmium	7.98	10.6	28	+-33					3.09	U
Chromium	437	376	15	+-20					2.58	U
Copper	392	404	3	+-20					1.80	U
ead	809	783	3	+-20					1.03	U
ercury	0.511	0.490	4	+-23					0.118	U
ickel	1530	1480	3	+-20					7.73	U
Selenium	2.37	2.06	14	+-47					1.05	U
Silver	U	U	NC	NC					1.80	U
Thallium	U	U	NC	NC					1.05	U
Zinc	1190	1130	5	+-20					5.15	U

' = Not Detected
NC= Non-calculable RPD due to value(s) less than detection limit
RPD= Relative percent difference

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MARCH 28, 1989

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US EPA Contract Laboratory

ANALYTICAL DATA REPORT PACKAGE FOR:

Client: FIRST ENVIRONMENT
Sample Source: FABCO - HARRISON, N.J.
Sampled By: S.S./J.V.

SAMPLE ID:	MATRIX	LAB NUMBER	DATE & TIME COLLECTED	AT LAB DATE
S-1 0-6"	SOIL	98096	02/13/89;11:06	02/13/89
S-1 18-24"	SOIL	98097	02/13/89;11:06	02/13/89
S-2 0-6"	SOIL	98098	02/13/89;11:05	02/13/89
S-2 18-24"	SOIL	98099	02/13/89;11:05	02/13/89
S-3 0-6"	SOIL	98100	02/13/89;11:20	02/13/89
S-3 18-24"	SOIL	98101	02/13/89;11:20	02/13/89
S-4	SOIL	98102	02/13/89;11:20	02/13/89
TRIP BLANK	WATER	98103	02/13/89	02/13/89
FIELD BLANK	WATER	98104	02/13/89	02/13/89
DUPLICATE 0-6"	SOIL	98105	02/13/89	02/13/89
DUPLICATE 18-24"	SOIL	98106	02/13/89	02/13/89

Supervisor/Manager Signature:

Richard S. Levine

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MARCH 28, 1989

LABORATORY ANALYSIS--VOLATILE POLLUTANTS
Note: Dichlorobenzenes analyzed as semi-volatiles.
GC/MS VOLATILES - TIER II DELIVERABLES PLUS 15 PEAKS

Lab Number: 98097
Client: FIRST ENVIRONMENT
Sample source: FASCO - HARRISON, N.J.
Sample ID: S-1 18-24"
Sample date: 02/13/89
Sampled by: S.S./J.V.
At lab date: 02/13/89
Matrix: SOIL

Parameter	Result ug/kg	Method Blank ug/kg	Minimum Detection Limit ug/kg
Chloromethane	U	U	7
Bromomethane	U	U	7
Vinyl Chloride	U	U	7
Chloroethane	U	U	7
Methylene Chloride	21B	2J	7
1,1-Dichloroethylene	U	U	7
1,1-Dichloroethane	U	U	7
total-1,2-Dichloroethene	U	U	7
Chloroform	U	U	7
1,2-Dichloroethane	U	U	7
1,1,1-Trichloroethane	U	U	7
Carbon Tetrachloride	U	U	7
Bromodichloromethane	U	U	7
1,2-Dichloropropane	U	U	7
t-1,3-Dichloropropene	U	U	7
Trichloroethylene	U	U	7
Dibromochloromethane	U	U	7
1,1,2-Trichloroethane	U	U	7
Benzene	U	U	7
c-1,3-Dichloropropene	U	U	7
2-Chloroethylvinyl Ether	U	U	7
Bromoform	U	U	7
Tetrachloroethylene	U	U	7
1,1,2,2-Tetrachloroethane	U	U	7
Toluene	U	U	7
Chlorobenzene	U	U	7
Ethylbenzene	U	U	7
Total Xylenes	U	U	7

ug/kg = micrograms/kilogram or ppb
Results are in ug/kg; they are reported on a dry weight basis.

U: Indicates a compound was analyzed for but not detected.
J: Indicates an estimated value. It is utilized when a reported value meets the identification criteria but the result is less than the specified detection limit but greater than zero.
B: Indicates that the analyte was found in the blank as well as the sample. It indicates possible/probable blank contamination.

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-27-89

LIBRARY SEARCH RESULTS OF NONTARGETED PEAKS WITH
ESTIMATED CONCENTRATION OF TENTATIVELY IDENTIFIED COMPOUNDS.

Data file name: >B5580
Lab number: 98097
Fraction: Volatiles

Scan Number	CAS No.	Retention Time	Compound Name	Molecular Weight	Estimated Concentration ug/kg
529		21.67	Unknown Hexane isomer		11 B

A: Indicates that the compound is an acetone based aldol-type condensation product formed by concentrating the extraction solvent (1:1 acetone/methylene chloride).
B: Indicates that the analyte was found in the blank as well as the sample. It further indicates possible/probable blank contamination.

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MARCH 28, 1989

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US EPA Contract Laboratory

LABORATORY ANALYSIS

Lab Number: 98098
Client: FIRST ENVIRONMENT
Sample Source: FABCO - HARRISON, N.J.
Sample ID: S-2 0-6"
Sampled by: S.S./J.V.
Sample Date: 02/13/89
At Lab Date: 02/13/89
Matrix: SOIL

Results in mg/kg dry weight basis.

Parameter	Sample Result	Dupl. Result	RPD	Dupl. Contr. Limits (RPD)	Spike Added	Spike Sample Result	Spike Recovery %	Spike Contr. Limits %	Min. Det. Limit	Metho... Anal...
Antimony	2.74								1.25	U
Arsenic	24.2								1.00	U
Beryllium	U								0.782	U
Cadmium	8.35								3.13	U
Chromium	142								2.60	U
Copper	239								1.83	U
Lead	523								1.02	U
Mercury	0.980								10.119	U
Nickel	235								7.82	U
Selenium	2.49								1.00	U
Silver	U								1.8[illegible]	U
Thallium	U.								1.00	U
Zinc	415								5.23	U

U = Not Detected
NC= Non-calculable RPD due to value(s) less than detection limit
RPD= Relative percent difference

INDUSTRIAL CORROSION MANAGEMENT, Inc.
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MARCH 28, 1989

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US EPA Contract Laboratory

LABORATORY ANALYSIS--VOLATILE POLLUTANTS
Note: Dichlorobenzenes analyzed as semi-volatiles.
GC/MS VOLATILES - TIER II DELIVERABLES PLUS 15 PEAKS

Lab Number:	98099
Client:	FIRST ENVIRONMENT
Sample source:	FABCO - HARRISON, N.J.
Sample ID:	S-2 18-24"
Sample date:	02/13/89
Sampled by:	S.S./J.V.
At lab date:	02/13/89
Matrix:	SOIL

Parameter	Result ug/kg	Method Blank ug/kg	Minimum Detection Limit ug/kg
Chloromethane	U	U	7
Bromomethane	U	U	7
Vinyl Chloride	U	U	7
Chloroethane	U	U	7
Methylene Chloride	4B	2J	7
1,1-Dichloroethylene	U	U	7
1,1-Dichloroethane	U	U	7
total-1,2-Dichloroethene	U	U	7
Chloroform	3J	U	7
1,2-Dichloroethane	U	U	7
1,1,1-Trichloroethane	U	U	7
Carbon Tetrachloride	U	U	7
Bromodichloromethane	U	U	7
1,2-Dichloropropane	U	U	7
t-1,3-Dichloropropene	U	U	7
Trichloroethylene	50	U	7
Dibromochloromethane	U	U	7
1,1,2-Trichloroethane	U	U	7
Benzene	U	U	7
c-1,3-Dichloropropene	U	U	7
2-Chloroethylvinyl Ether	U	U	7
Bromoform	U	U	7
Tetrachloroethylene	U	U	7
1,1,2,2-Tetrachloroethane	U	U	7
Toluene	U	U	7
Chlorobenzene	U	U	7
Ethylbenzene	U	U	7
Total Xylenes	U	U	7

ug/kg = micrograms/kilogram or ppb
Results are in ug/kg; they are reported on a dry weight basis.

U: Indicates a compound was analyzed for but not detected.
J: Indicates an estimated value. It is utilized when a reported value meets the identification criteria but the result is less than the specified detection limit but greater than zero.
B: Indicates that the analyte was found in the blank as well as the sample. It indicates possible/probable blank contamination.

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LIBRARY SEARCH RESULTS OF NONTARGETED PEAKS WITH
ESTIMATED CONCENTRATION OF TENTATIVELY IDENTIFIED COMPOUNDS.

Data file name: B5579
Lab number: 98099
Fraction: Volatiles

Scan Number	CAS No.	Retention Time	Compound Name	Molecular Weight	Estimated Concentration ug/kg
529		21.63	Unknown Hexane isomer		5 B

A: Indicates that the compound is an acetone based aldol-type condensation product formed by concentrating the extraction solvent (1:1 acetone/methylene chloride)
B: Indicates that the analyte was found in the blank as well as the sample. It further indicates possible/probable blank contamination.

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LABORATORY ANALYSIS

Lab Number:	89100
Client:	FIRST ENVIRONMENT
Sample Source:	FASCO - HARRISON, N.J.
Sample ID:	S-3 0-6"
Sampled by:	S.S./J.V.
Sample Date:	02/13/89
At Lab Date:	02/13/89
Matrix:	SOIL

Results in mg/kg dry weight basis.

Parameter	Sample Result	Dupl. Result	RPD	Dupl. Contr. Limits (RPD)	Spike Added	Spike Sample Result	Spike Recovery %	Spike Contr. Limits %	Min. Det. Limit	Meth. Blk. Analy.
Antimony	3.64								1.63	U
Arsenic	41.7								1.30	U
Beryllium	U								0.978	U
Cadmium	16.3								3.91	U
Chromium	166								3.26	U
Copper	324								2.28	U
Lead	901								1.25	U
Mercury	2.05								0.153	U
Nickel	264								9.78	U
Selenium	5.54								1.30	U
Silver	U								2.28	U
Thallium	U								1.30	U
Zinc	1110								6.52	U

U = Not Detected
NC= Non-calculable RPD due to value(s) less than detection limit
RPD= Relative percent difference

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LABORATORY ANALYSIS--VOLATILE POLLUTANTS
Note: Dichlorobenzenes analyzed as semi-volatiles.
GC/MS VOLATILES - TIER II DELIVERABLES PLUS 15 PEAKS

Lab Number: 90101
Client: FLEET ENVIRONMENT
Sample source: FABCO - HARRISON, N.J.
Sample ID: S-3 18-24"
Sample date: 02/13/89
Sampled by: S.S./J.V.
At lab date: 02/13/89
Matrix: SOIL

Parameter	Result ug/kg	Method Blank ug/kg	Minimum Detection Limit ug/kg
Chloromethane	U	U	7
Bromomethane	U	U	7
Vinyl Chloride	U	U	7
Chloroethane	U	U	7
Methylene Chloride	25B	2J	7
1,1-Dichloroethylene	U	U	7
1,1-Dichloroethane	U	U	7
total-1,2-Dichloroethene	U	U	7
Chloroform	U	U	7
1,2-Dichloroethane	U	U	7
1,1,1-Trichloroethane	U	U	7
Carbon Tetrachloride	U	U	7
Bromodichloromethane	U	U	7
1,2-Dichloropropane	U	U	7
t-1,3-Dichloropropene	U	U	7
Trichloroethylene	U	U	7
Dibromochloromethane	U	U	7
1,1,2-Trichloroethane	U	U	7
Benzene	U	U	7
c-1,3-Dichloropropene	U	U	7
2-Chloroethylvinyl Ether	U	U	7
Bromoform	U	U	7
Tetrachloroethylene	U	U	7
1,1,2,2-Tetrachloroethane	U	U	7
Toluene	U	U	7
Chlorobenzene	U	U	7
Ethylbenzene	U	U	7
Total Xylenes	U	U	7

ug/kg = micrograms/kilogram or ppb
Results are in ug/kg; they are reported on a dry weight basis.

U: Indicates a compound was analyzed for but not detected.
J: Indicates an estimated value. It is utilized when a reported value meets the identification criteria but the result is less than the specified detection limit but greater than zero.
B: Indicates that the analyte was found in the blank as well as the sample. It indicates possible/probable blank contamination.

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Laboratory ID# 14116
!-27-89

LIBRARY SEARCH RESULTS OF NONTARGETED PEAKS WITH
ESTIMATED CONCENTRATION OF TENTATIVELY IDENTIFIED COMPOUNDS.

Data file name: >85581
ab number: 98101
raction: Volatiles

Scan Number	CAS No.	Retention Time	Compound Name	Molecular Weight	Estimated Concentration ug/kg
528		21.65	Unknown Hexane isomer		16 B

A: Indicates that the compound is an acetone based aldol-type condensation product formed by concentrating the extraction solvent (1:1 acetone/methylene chloride).
B: Indicates that the analyte was found in the blank as well as the sample. It further indicates possible/probable blank contamination.

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MARCH 28, 1989

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LABORATORY ANALYSIS--PRIORITY POLLUTANT PESTICIDE/PCB
GC - ELECTRON CAPTURE DETECTOR
TIER TWO DELIVERABLES

Lab Number:	98102
Client:	FIRST ENVIRONMENT
Sample Source:	FABCO - HARRISON, N.J.
Sample ID:	S-4
Sample Date:	02/13/89
Sampled By:	S.S./J.V.
At Lab Date:	02/13/89
Matrix:	SOIL

Parameter	Result ug/kg	Method Blank ug/kg	Minimum Detection Limit ug/kg
Arochlor 1016	U	U	20
Arochlor 1221	U	U	20
Arochlor 1232	U	U	20
Arochlor 1242	U	U	20
Arochlor 1248	U	U	20
Arochlor 1254	U	U	20
Arochlor 1260	U	U	20

ug/kg = micrograms/kilogram or ppb
Results are reported on a dry weight basis.

U: Indicates a compound was analyzed for but not detected.
J: Indicates an estimated value. It is utilized when a reported value meets the identification criteria but the result is less than the specified detection limit but greater than zero.
B: Indicates that the analyte was found in the blank as well as the sample. It indicates possible/probable blank contamination.

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ARCH 28, 1989

NJ DEP Certified Drinking Water/Wastewat
Laboratory ID# 14116
US EPA Contract Laboratory

LABORATORY ANALYSIS--EP TOXICITY TEST
Leachate Analysis (FR Vol. 45, No. 98)

Lab Number: 98102
Client: FIRST ENVIRONMENT
ample Source: FABCO - HARRISON, N.J.
ample ID: S-4
Sampling Date: 02/13/89
ampled by: S.S./J.V.
t Lab Date: 02/13/89

Parameter	Result mg/l	Dupl. mg/l	Spike Recovery %	Method Blank Value mg/l	Minimum Detection Limit mg/l	Maximum Permissible Concentration mg/l
Arsenic	U	U	96	U	0.004	5.0
Barium	U	U	97	U	0.04	100.0
Cadmium	U	U	102	U	0.012	1.0
Chromium	U	U	90	U	0.01	5.0
Lead	U	U	114	U	0.16	5.0
Mercury	U	U	123	U	0.0005	0.2
Selenium	U	U	104	U	0.004	1.0
Silver	U	U	108	U	0.007	5.0

Not Detected

INDUSTRIAL CORROSION MANAGEMENT, Inc.
Richard Levine, President

INDUSTRIAL CORROSION MANAGEMENT INC.
1152 Route 10
Randolph, NJ 07869
201-584-0330
MARCH 27, 1990

NJ DEP Certified Drinking Water/Wastewater
Laboratory ID# 14116
US EPA Contract Laboratory

ANALYTICAL DATA SUMMARY REPORT FOR: FIRST ENVIRONMENT:GUYON PIPES-1

This summary lists parameters and concentrations found in the samples submitted.

PARAMETER (units)	SAMPLE ID							
	S-201	S-202	S-203	DUP	FIELD BLANK	TRIP BLANK		
Metals (ppm): Antimony	U	30.9	79.3	2.63	U	U		
Arsenic	35.2	40.1	33.8	26.4	U	U		
Beryllium	0.372	0.536	0.509	0.777	U	U		
Cadmium	U	1.46	1.75	0.837	U	U		
Chromium	28.0	35.5	31.6	98.6	U	U		
Copper	148	432	401	156	U	U		
Lead	277	3710	3330	324	U	U		
Mercury	0.595	9.13	10.2	7.77	U	U		
Nickel	46.9	40.1	39.7	141	U	U		
Selenium	2.42	2.99	2.69	1.14	U	U		
Silver	0.930	6.59	10.7	U	U	U		
Thallium	0.434	0.460	0.364	0.478	U	U		
Zinc	77.5	904	1020	316	U	U		

U: Indicates a compound was analyzed for but not detected.
J: Indicates an estimated value. It is utilized when a reported value meets the identification criteria but the result is less than the specified detection limit but greater than zero.
B: Indicates that the analyte was found in the blank as well as the sample. It indicates possible/probable blank contamination.
NA: Not analyzed.

INDUSTRIAL CORROSION MANAGEMENT, Inc.
1152 Route 10
Randolph, NJ 07869
201-584-0330
MARCH 27, 1990

NJ DEP Certified Drinking Water/Wastewater
Laboratory ID# 14116
US EPA Contract Laboratory

LABORATORY ANALYSIS

Lab Number:	113623
Client:	FIRST ENVIRONMENT
Sample Source:	GUYON PIPES
Sample ID:	S-201
Sampled by:	CUSTOMER
Sample Date:	03/02/90
At Lab Date:	03/02/90
Matrix:	SOIL

Results in mg/kg dry weight basis.

Parameter	Sample Result	Dupl. Result	RPD	Dupl. Contr. Limits (RPD)	Spike Added	Spike Sample Result	Spike Recovery %	Spike Contr. Limits %	Min. Det. Limit	Method Blank Anal.
Antimony	U								1.55	U
Arsenic	35.2								0.248	U
Beryllium	0.372								0.310	U
Cadmium	U								0.310	U
Chromium	28.0								0.620	U
Copper	148								1.55	U
Lead	277								3.10	U
Mercury	0.595								0.124	U
Nickel	46.9								1.55	U
Selenium	2.42								0.248	U
Silver	0.930								0.620	U
Thallium	0.434								0.248	U
Zinc	77.5								1.24	U

U = Not Detected
NC= Non-calculable RPD due to value(s) less than detection limit
RPD= Relative percent difference

INDUSTRIAL CORROSION MANAGEMENT, Inc.
Richard Levine, President

MEW

INDUSTRIAL CORROSION MANAGEMENT, Inc.
1152 Route 10
Randolph, NJ 07869
201-584-0330
MARCH 27, 1990

NJ DEP Certified Drinking Water/Wastewater
Laboratory ID# 14116
US EPA Contract Laboratory

LABORATORY ANALYSIS

Lab Number:	113624
Client:	FIRST ENVIRONMENT
Sample Source:	GUYON PIPES
Sample ID:	S-202
Sampled by:	CUSTOMER
Sample Date:	03/02/90
At Lab Date:	03/02/90
Matrix:	SOIL

Results in mg/kg dry weight basis.

Parameter	Sample Result	Dupl. Result	RPD	Dupl. Contr. Limits (RPD)	Spike Added	Spike Sample Result	Spike Recovery %	Spike Contr. Limits %	Min. Det. Limit	Method Blank Anal.
Antimony	30.9								1.91	U
Arsenic	40.1								0.306	U
Beryllium	0.536								0.383	U
Cadmium	1.46								0.383	U
Chromium	35.5								0.766	U
Copper	432								1.91	U
Lead	3710								3.83	U
Mercury	9.13								0.153	U
Nickel	40.1								1.91	U
Selenium	2.99								0.306	U
Silver	6.59								0.766	U
Thallium	0.460								0.306	U
Zinc	904								1.53	U

U = Not Detected
NC= Non-calculable RPD due to value(s) less than detection limit
RPD= Relative percent difference

INDUSTRIAL CORROSION MANAGEMENT, Inc.
Richard Levine, President

MEW

INDUSTRIAL CORROSION MANAGEMENT, Inc.
1152 Route 10
Randolph, NJ 07869
201-584-0330
MARCH 27, 1990

NJ DEP Certified Drinking Water/Wastewater
Laboratory ID# 14116
US EPA Contract Laboratory

LABORATORY ANALYSIS

Lab Number:	113625
Client:	FIRST ENVIRONMENT
Sample Source:	GUYON PIPES
Sample ID:	S-203
Sampled by:	CUSTOMER
Sample Date:	03/02/90
At Lab Date:	03/02/90
Matrix:	SOIL

Results in mg/kg dry weight basis.

Parameter	Sample Result	Dupl. Result	RPD	Dupl. Contr. Limits (RPD)	Spike Added	Spike Sample Result	Spike Recovery %	Spike Contr. Limits %	Min. Det. Limit	Method Blank Anal.
Antimony	79.3								1.82	U
Arsenic	33.8								0.291	U
Beryllium	0.509								0.364	U
Cadmium	1.75								0.364	U
Chromium	31.8								0.727	U
Copper	401								1.82	U
Lead	3330								3.64	U
Mercury	10.2								0.145	U
Nickel	39.7								1.82	U
Selenium	2.69								0.291	U
Silver	10.7								0.727	U
Thallium	0.364								0.291	U
Zinc	1020								1.45	U

U = Not Detected
NC= Non-calculable RPD due to value(s) less than detection limit
RPD= Relative percent difference

INDUSTRIAL CORROSION MANAGEMENT, Inc.
Richard Levine, President

MEW

INDUSTRIAL CORROSION MANAGEMENT, Inc.
1152 Route 10
Randolph, NJ 07869
201-584-0330
MARCH 27, 1990

NJ DEP Certified Drinking Water/Wastewater
Laboratory ID# 14116
US EPA Contract Laboratory

LABORATORY ANALYSIS

Lab Number: 113626
Client: FIRST ENVIRONMENT
Sample Source: GUYON PIPES
Sample ID: DUPLICATE
Sampled by: CUSTOMER
Sample Date: 03/02/90
At Lab Date: 03/02/90
Matrix: SOIL

Results in mg/kg dry weight basis.

Parameter	Sample Result	Dupl. Result	RPD	Dupl. Contr. Limits (RPD)	Spike Added	Spike Sample Result	Spike Recovery %	Spike Contr. Limits %	Min. Det. Limit	Method Blank Anal.
Antimony	2.63								1.49	U
Arsenic	26.4								0.239	U
Beryllium	0.777								0.299	U
Cadmium	0.837								0.299	U
Chromium	98.6								0.598	U
Copper	156								1.49	U
Lead	324								2.99	U
Mercury	7.77								0.120	U
Nickel	141								1.49	U
Selenium	1.14								0.239	U
Silver	U								0.598	U
Thallium	0.478								0.239	U
Zinc	314								1.20	U

U = Not Detected
NC= Non-calculable RPD due to value(s) less than detection limit
RPD= Relative percent difference

INDUSTRIAL CORROSION MANAGEMENT, Inc.
Richard Levine, President

MEW

RECEIVED
MAR 22 1990
FIRST ENVIRONM

Client: ECRACOM

Address: PARK 80 WEST, PLAZA TWO, SUITE 200, SADDLE BROOK, NJ 07662

Project No.: GUYON GENERAL PIPING Contact: LISA KAPLAN

Veritech Lab No.: 6693-84

VERITECH LABORATORY REPORT

47 CAREY AVENUE
BUTLER, NJ 07405
(201) 492-8744

Date Received: 3/2/90 Received By: SG

Date Completed: 3/14/90 COC: YES

Date Reported: 3/14/90 NJDEP Laboratory No. 14622

Invoice No.: Invoice To: SAME

COURIER CHARGE: NO

Sample Matrix: Soil(X) Water( ) Waste( )

Deliverables: Results Only(X) Tier II( )

This report is a true report of results obtained from our tests of this material. In lieu of a formal contract document, the total aggregate liability of Veritech to all parties shall not exceed Veritech's total fee for analytical services rendered.

Stanley Silewicz
Laboratory Manager

876970198

Client: ECRACOM

Address: PARK 80 WEST, PLAZA TWO, SUITE 200, SADDLE BROOK, NJ 07662

Project No.: GUYON GENERAL PIPING Contact: LISA KAPLAN

Veritech Lab No.: 6683-84

~~EXTERIOR PAINT SHOP~~

SAMPLE NO.		RR TRACKS	TRANSFORMER
LAB NO.	MDL	6683	6684
TEST			
EP-TOX			
As	0.0008	0.0023	0.0065
Ba	0.38	1.48	2.05
Cd	0.04	0.06	ND
Cr	0.5	ND	ND
Pb	0.25	12.8	0.40
Hg	0.0005	ND	ND
Se	0.0012	ND	ND
Ag	0.03	ND	ND
CYANIDE (REACTIVE)	0.1	ND	ND
SULFIDE (REACTIVE)	5	15	19
IGNITABILITY	NA	ND	ND
TPH	11	5182	173
CORROSIVITY (pH)	NA	6.2	8.5

All Concentrations Reported As: ppm
MDL = Method Detection Limit
ND = Not Detected Above MDL
NA = Not Applicable

876970199

Client: ECRACOM

Address: PARK 80 WEST, PLAZA TWO, SUITE 200, SADDLE BROOK, NJ 07662

Project No.: GUYON GENERAL PIPING Contact: LISA KAPLAN

Veritech Lab No.: 6683-84

SAMPLE NO.	RR TRACKS	EXTERIOR OF PAINT SHOP TRANSFORMER	
LAB NO.	6683	6684	MDL
TEST 608/PCB SCAN			
PCB-1016	ND	ND	2.5
PCB-1221	ND	ND	2.5
PCB-1232	ND	ND	2.5
PCB-1242	BMDL	ND	2.5
PCB-1248	ND	ND	2.5
PCB-1254	3.8	ND	2.5
PCB-1260	ND	ND	2.5

All Concentrations Reported As: ppm
MDL = Method Detection Limit
ND = Not Detected Above MDL
NA = Not Applicable
BMDL = Compound Is Present But Below Method Detection Limit

RECYCLING TECHNOLOGIES INC.

SITE ENTRY TICKET

APPROVAL # 131508 TICKET # 001

RECYCLING FACILITY: Clean America
3300 Childs Street
Baltimore, Maryland

BROKER/CONTRACTOR: Ecracon, Inc. WGT. IN

GENERATOR: Guyan General Piping, Inc. WGT. OUT

TRANSPORTER: Horwith Trucks NET WGT.

TRUCK TAG # & STATE: EQUIV. TONS

TRUCK #: 222

DRIVER'S NAME: HANK

DATE & TIME DISPATCHED: BY: Paul Delaney Jr.

DATE & TIME RECEIVED: BY:

INSPECTED & ACCEPTED BY:

WEIGH MASTER SIG.:

NOTICE TO TRUCKER:
TRUCKS WILL NOT BE PERMITTED TO ENTER THE FACILITY WITHOUT THIS ENTRANCE TICKET.

WHITE - BILLING GREEN - BILLING FILE CANARY - FACILITY PINK - GENERATOR/BROKER GOLDENROD - TRUCK

876970201

SOIL RECYCLING TECHNOLOGIES INC.
SITE ENTRY TICKET

APPROVAL # 13150

TICKET # 002

RECYCLING FACILITY: Clean America
3300 Childs Street
Baltimore, Maryland

BROKER/CONTRACTOR: Ecocon, Inc.

GENERATOR: Guyon General Piping, Inc.

TRANSPORTER: Horwith Trucks, Inc.

TRUCK TAG # & STATE:

TRUCK #: 236

DRIVER'S NAME: CASIERE

DATE & TIME DISPATCHED:

DATE & TIME RECEIVED:

INSPECTED & ACCEPTED BY:

WEIGH MASTER SIG.:

WGT. IN

WGT. OUT

NET WGT.

EQUIV. TONS

BY:

BY:

NOTICE TO TRUCKER:
TRUCKS WILL NOT BE PERMITTED TO ENTER THE FACILITY WITHOUT THIS ENTRANCE TICKET.

BILLING · CANARY · FACILITY PINK · GENERATOR/BROKER GOLDENROD · TRUCK

876970202

RECYCLING TECHNOLOGIES INC.
SITE ENTRY TICKET

APPROVAL # 131308 TICKET # 003

RECYCLING FACILITY: Clean Action
3300 Childs Street
Baltimore, Maryland

BROKER/CONTRACTOR: Ecracon, Inc.
GENERATOR: Guyan General Piping, Inc.
TRANSPORTER: Horwith Trucks
TRUCK TAG # & STATE:
TRUCK #: 200
DRIVER'S NAME: GALLOCI
DATE & TIME DISPATCHED:
DATE & TIME RECEIVED:
INSPECTED & ACCEPTED BY:
WEIGH MASTER SIG.:

WGT. IN
WGT. OUT
NET WGT.
EQUIV. TONS
BY:
BY:

NOTICE TO TRUCKER:
TRUCKS WILL NOT BE PERMITTED TO ENTER THE FACILITY WITHOUT THIS ENTRANCE TICKET.

WHITE - BILLING GREEN - BILLING FILE CANARY - FACILITY PINK - GENERATOR/BROKER GOLDENROD - TRUCK

876970203

JOHN ALMASI TRUCKING CO., INC.
63 METUCHEN AVE.
WOODBRIDGE N.J. 07095
634-8741

Incorporated 1929

60 years of SERVICE

March 27,1990

ECRACOM
PLAZA 2, SUITE 200
SADDLEBROOK, N.J. 07662

To Whom it May Concern:

Please be advised that the 45.74 TONS of material delivered to GUYON GENERAL PIPING, HARRISON, N.J. on or about March 2,1990 is certified clean fill.

The soil originates from a pit off Main Street, in South Amboy.

There have been no alterations since the tests performed August 21, 1989, by S.&S. Environmental Sciences, Inc..

Sincerely,

William E. Almasi

William E. Almasi
JOHN ALMASI TRUCKING CO. INC.

PSE&G

Public Service Electric and Gas Company 325 County Avenue Secaucus, New Jersey 07094

April 3, 1990

Mr. Jake Nemergut
First Environment
90 Riverdale Road
Riverdale, New Jersey 07457

Dear Mr. Nemergut:

PCB INQUIRY
FABCO PIPING INC.
1000 SOUTH FOURTH STREET
HARRISON, NEW JERSEY

We acknowledge receipt of your letter dated March 29, 1990 concerning the presence of PCB transformers at the above location.

Public Service Electric and Gas Company fully complies with all applicable federal regulations as provided for in U. S. Environmental Protection Agency Regulations at (40) CFR Part 761 with respect to the aforesaid equipment. Specifically, at the above location, none of the PSE&G owned transformers can be classified under the regulations as PCB.

All PSE&G distribution transformers are mineral oil filled and classified under the regulations as non-PCB, that is, to contain less than 50 PPM PCB, (40 CFR Part 761.3, Federal Register/Vol. 44, No. 106/Thursday, May 31, 1979 at 31517) or PCB contaminated, that is, to contain 50 PPM or greater PCB but less than 500 PPM PCB, (40 Part 761.2, Federal Register/Vol. 44, No. 106/Thursday, May 31, 1979 at 31517). We do not believe this equipment poses an exposure risk.

If you have any further questions, please contact Mr. H. Rymaniak of this office at (201)330-6591.

Very truly yours,

G. M. Dolinsky
Planning & Customer Operations
Manager
Palisades Division

HR/fle
pcbinq

The Energy People

Client: ECRACOM

Address: PARK 80 WEST, PLAZA TWO, SUITE 200, SADDLE BROOK, NJ 07662

Project No.: GUYON GENERAL PIPING Contact: LISA KAPLAN

Veritech Lab No.: 5660

SAMPLE NO.		SAND BLASTING GRIT
LAB NO.	MDL	5660
TEST		
EP-TOX		
As	0.001	0.007
Ba	1.2	ND
Cd	0.03	0.03
Cr	0.1	ND
Pb	0.2	ND
Hg	0.0005	0.0007
Se	0.002	ND
Ag	0.04	ND
Ni	0.07	0.3
FLUORIDE	1.0	ND
CYANIDE (REACTIVE)	0.09	ND
SULFIDE (REACTIVE)	2	250
IGNITABILITY	NA	NOT IGNITABLE
TPH	10	104
CORROSIVITY (pH)	NA	5.5

All Concentrations Reported As: ppm
MDL = Method Detection Limit
ND = Not Detected Above MDL
NA = Not Applicable

876970206

Client: ECRACOM

Address: PARK 80 WEST, PLAZA TWO, SUITE 200, SADDLE BROOK, NJ 07662

Project No.: GUYON GENERAL PIPING Contact: LISA KAPLAN

Veritech Lab No.: 5660

SAMPLE NO.		SAND BLASTING GRIT
LAB NO.	MDL	5660
TEST		
TOTAL PHENOLS	0.03	1.9
TOTAL CYANIDE	0.04	ND
% SOLIDS	NA	96

All Concentrations Reported As: ppm (EXCEPT WHERE NOTED)
MDL = Method Detection Limit
ND = Not Detected Above MDL
NA = Not Applicable

876970207

Client: ECRACOM

Address: PARK 80 WEST, PLAZA TWO, SUITE 200, SADDLE BROOK, NJ 07662

Project No.: GUYON GENERAL PIPING Contact: LISA KAPLAN

Veritech Lab No.: 5660

SAMPLE NO.	SAND BLASTING GRIT	
LAB NO.	5660	MDL
TEST 608/PCB SCAN		
PCB-1016	ND	0.5
PCB-1221	ND	0.5
PCB-1232	ND	0.5
PCB-1242	ND	0.5
PCB-1248	ND	0.5
PCB-1254	1.0	0.5
PCB-1260	ND	0.5

All Concentrations Reported As: ppm
MDL = Method Detection Limit
ND = Not Detected Above MDL
NA = Not Applicable

876970208

Client: ECRACOM

Address: PARK 80 WEST. PLAZA TWO. SUITE 200, SADDLE BROOK. NJ 07662

Project No.: GUYON GENERAL PIPING Contact: LISA KAPLAN

Veritech Lab No.: 5660

SAMPLE NO.	SAND BLASTING GRIT	
LAB NO.	5660	MDL
TEST 601 SCAN		
BROMODICHLOROMETHANE	ND	10
BROMOFORM	ND	10
BROMOMETHANE	ND	10
CARBON TETRACHLORIDE	ND	10
CHLOROBENZENE	ND	10
CHLOROETHANE	ND	10
2-CHLOROETHYLVINYL ETHER	ND	10
CHLOROFORM	ND	10
CHLOROMETHANE	ND	10
DIBROMOCHLOROMETHANE	ND	10
1,2-DICHLOROBENZENE	ND	10
1,3-DICHLOROBENZENE	ND	10
1,4-DICHLOROBENZENE	ND	10
DICHLORODIFLUOROMETHANE	ND	10
1,1-DICHLOROETHANE	ND	10
1,2-DICHLOROETHANE	ND	10
1,1-DICHLOROETHENE	ND	10
TRANS-1,2-DICHLOROETHENE	ND	10
1.2-DICHLOROPROPANE	ND	10
CIS-1,3-DICHLOROPROPENE	ND	10
TRANS-1.3-DICHLOROPROPENE	ND	10
METHYLENE CHLORIDE	BMDL	10
1,1,2,2-TETRACHLOROETHANE	ND	10
TETRACHLOROETHENE	ND	10
1,1,1-TRICHLOROETHANE	ND	10
1,1,2-TRICHLOROETHANE	ND	10
TRICHLOROETHENE	ND	10
TRICHLOROFLUOROMETHANE	ND	10
VINYL CHLORIDE	ND	10

All Concentrations Reported As: ppm
BMDL = Compound Present But Below Method Detection Limit
MDL = Method Detection Limit
ND = Not Detected Above MDL
NA = Not Applicable

876970209

AMERICAN WASTE SERVICES, INC.

C/O LIBERTY CENTRE - SUITE 7
3530 BELMONT AVE., YOUNGSTOWN, OHIO 44505 PHONE (216) 759-7476

NON-HAZARDOUS WASTE MANIFEST DOCUMENT NO. 7481

THIS SECTION TO BE COMPLETED BY GENERATOR:

COMPANY NAME	ADDRESS	PICK-UP DATE
Guyon General Piping, Inc.	900 S. 4th St.	12-12-87
	Harrison NJ 07029 (CITY / STATE / ZIP)	WASTE NO. 2534-3

NAME OR DESCRIPTION OF WASTE SHIPPED: Sand Blasting Grit — P.O. NO.:

COMMENTS

GENERATOR ➡ OR AGENT ➡ MUST FILL ➡ IN QUANTITY ➡

QUANTITY SHIPPED: ONE LOAD

IN CASE OF AN EMERGENCY OR SPILL, CONTACT	NAME	PHONE NO.	24-HR. EMERGENCY NO.

I hereby certify that the above named materials are properly classified, described, packaged, marked, and labeled and are in proper condition for transportation according to the applicable regulations of the DOT and the EPA. — SIGNATURE: [signature] — DATE: 12/11/87

THIS SECTION TO BE COMPLETED BY THE HAULER/TRANSPORTER:

COMPANY NAME	ADDRESS	PHONE NO.
HORWITH TRUCKS	RT 329 NORTHAMPTON PA 18067	215-261-2225

VEHICLE I.D. NO. | STATE | COMMENTS

I Hereby certify that the above described wastes were accepted for transportation at the producer's site and delivered to and off loaded at the waste facility. Both as listed hereupon. — SIGNATURE (DRIVER): [signature] — DATE: 12-11-87

THIS SECTION TO BE COMPLETED BY RECEIVER AT DISPOSAL SITE:

COMPANY NAME	ADDRESS	PHONE NO.
BROWNSTONE LANDFILL	RR 1 CHAPEL ST S.E. WAYNESBURG OHIO	753-7476

RECEIVER'S PERMIT NO. | COMMENTS

I Hereby certify that the above described wastes were delivered to this Facility, that the Facility is authorized and permitted to receive such wastes. — AUTHORIZED SIGNATURE | BILL NO. | DATE

GENERATOR: Copies 1 & 6 — AMERICAN WASTE SERVICES, INC: Copies 2 & 3 — RECEIVER: Copy 4 — HAULER: Copy 5

GENERATOR - COPY 1

SEE LANDFILL RULES AND REGULATIONS ON BACK

876970210

WEST HUDSON

836 HARRISON AVE.

KEARNY, N. J. 07032 TEL. [illegible]-1216

Date 12/2/89 Weight 78410

Name Kriuth

Name of Truck

Tractor Lic. No. 204

Trailer Lic. No. 157

Truck Lic. No.

CLEAR ☒
RAIN ☐
SNOW ☐

PAID 4.00 ROUND TRIP

CHARGE

Weighmaster [signature]

60059

Weight obtained by using THE HOWE PATENTED RECORDING BEAM No.

From To

42 830 Gross

35 580 Tare

78410 Net

Load of

Driver { ON / OFF

Fees Date 19

Weigher

876970211

AMERICAN WASTE SERVICES, INC.

C/O LIBERTY CENTRE - SUITE 7
3530 BELMONT AVE., YOUNGSTOWN, OHIO 44505 PHONE (216) 759-7476

NON-HAZARDOUS WASTE MANIFEST

DOCUMENT NO. 7484

THIS SECTION TO BE COMPLETED BY GENERATOR:

COMPANY NAME	ADDRESS	PICK-UP DATE
Guyon General Piping, Inc.	900 S. 6th St.	12-12-87
	Harrison NJ 07029 (CITY / STATE / ZIP)	WASTE NO. 2534-3

NAME OR DESCRIPTION OF WASTE SHIPPED: Sand Blasting Grit — P.O. NO.:

COMMENTS

GENERATOR ➡ OR AGENT ➡ MUST FILL ➡ IN QUANTITY ➡

QUANTITY SHIPPED: ONE LOAD

IN CASE OF AN EMERGENCY OR SPILL CONTACT	NAME	PHONE NO.	24-HR. EMERGENCY NO.

I hereby certify that the above named material(s) are properly classified, described, packaged, marked, and labeled and are in proper condition for transportation according to the applicable regulations of the DOT and the EPA. SIGNATURE: [signature] DATE: 12/11/87

THIS SECTION TO BE COMPLETED BY THE HAULER/TRANSPORTER:

COMPANY NAME	ADDRESS	PHONE NO.
HORWITH TRUCKS	RT 329 NORTHAMPTON PA 18067	215 261 3220
VEHICLE I.D. NO. / STATE	COMMENTS	

I Hereby certify that the above described wastes were accepted for transportation at the producer's site and delivered to and off loaded at the waste facility. Both as listed hereupon. SIGNATURE (DRIVER): [signature] DATE: 12-15

THIS SECTION TO BE COMPLETED BY RECEIVER AT DISPOSAL SITE:

COMPANY NAME	ADDRESS	PHONE NO.
BOTTOM LINE LANDFILL	7116 CHADD ST SE LAWRENCEBURG, OH	812 539-7112
RECEIVER'S PERMIT NO. / COMMENTS		

I Hereby certify that the above described wastes were delivered to this Facility, that the Facility is authorized and permitted to receive such wastes.	AUTHORIZED SIGNATURE	CELL NO.	DATE

GENERATOR: Copies 1 & 6 — AMERICAN WASTE SERVICES, INC.: Copies 2 & 3 — RECEIVER: Copy 4 — HAULER: Copy 5

GENERATOR - COPY 1

SEE LANDFILL RULES AND REGULATIONS ON BACK

876970212

WEST HUDSON

696 HARRISON AVE.

KEARNY, N. J. 07032 TEL. 955-1216

Date 12/12/25 Weight 80770

Name HARRITH

Name of Truck

Tractor Lic. No.

Trailer Lic. No. 225

Truck Lic. No.

CLEAR ☒

RAIN ☐

SNOW ☐

PAID 1.00 ROUND TRIP

CHARGE

Weighmaster Raymond Tarby

50060

Weight obtained by using THE HOWE PATENTED RECORDING BEAM No.

From To

45 320 Gross

35 420 Tare

80770 Net

Load of

Driver { ON OFF

Feet Date 19

Weigher

876970213

AMERICAN WASTE SERVICES, INC.

C/O LIBERTY CENTRE - SUITE 7
3530 BELMONT AVE., YOUNGSTOWN, OHIO 44505 PHONE (216) 759-7476

NON-HAZARDOUS WASTE MANIFEST

DOCUMENT NO. 74848

THIS SECTION TO BE COMPLETED BY GENERATOR:

COMPANY NAME	ADDRESS	PICK-UP DATE
Guyon General Piping, Inc.	900 S. 4th St.	12-12-89
	CITY Harrison STATE NJ ZIP 07029	WASTE NO 2536-3

NAME OR DESCRIPTION OF WASTE SHIPPED: Sand Blasting Grit

P.O. NO.

COMMENTS

GENERATOR OR AGENT MUST FILL IN QUANTITY

QUANTITY SHIPPED: ONE LOAD

IN CASE OF AN EMERGENCY OR SPILL, CONTACT	NAME	PHONE NO.	24-HR. EMERGENCY NO

I Hereby certify that the above named materials are properly classified, described, packaged, marked, and labeled and are in proper condition for transportation according to the applicable regulations of the DOT and the EPA.

SIGNATURE: Glenda Tabulo DATE: 12/11/89

THIS SECTION TO BE COMPLETED BY THE HAULER/TRANSPORTER:

COMPANY NAME	ADDRESS	PHONE NO.
HARWITH TRUCKS	RT 329 NORTHAMPTON PA 18067	215 261 2227
VEHICLE I.D. NO. / STATE	COMMENTS	

I Hereby certify that the above described wastes were accepted for transportation at the producer's site and delivered to and off loaded at the waste facility. Both as listed hereupon.

SIGNATURE (DRIVER): Earl Kunbel DATE: 12-12-89

THIS SECTION TO BE COMPLETED BY RECEIVER AT DISPOSAL SITE:

COMPANY NAME	ADDRESS	PHONE NO.
BFI TRISTATE LANDFILL	P.O. BOX 1116 CHAPEL ST SE WAYNESBURG, OH	216 859 2776
RECEIVERS PERMIT NO. / COMMENTS		

I Hereby certify that the above described wastes were delivered to this Facility, that the Facility is authorized and permitted to receive such wastes.

AUTHORIZED SIGNATURE | CELL NO. | DATE

GENERATOR: Copies 1 & 6 AMERICAN WASTE SERVICES, INC: Copies 2 & 3 RECEIVER: Copy 4 HAULER: Copy 5

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SEE LANDFILL RULES AND REGULATIONS ON BACK

876970214

WEST HUDSON

936 HARRISON AVE.

KEARNY, N. J. 07032 TEL. [illegible]-1216

Date 12/12/85 Weight 77510

Name HARWITA

Name of Truck

Tractor Lic. No.

Trailer Lic. No. 237

Truck Lic. No. 180

CLEAR ☐
RAIN ☐
SNOW ☐

PAID 4.00 ROUND TRIP

CHARGE

Weighmaster [signature]

$00.61

Weight obtained by using THE HOWE PATENTED RECORDING BEAM No.

From To

44 510 Gross Load of

33 290 Tare Driver { ON OFF

77510 Net Fees Date 19

Weigher

876970215

AMERICAN WASTE SERVICES, INC.

C/O LIBERTY CENTRE - SUITE 7
3530 BELMONT AVE., YOUNGSTOWN, OHIO 44505 PHONE (216) 759-7476

NON-HAZARDOUS WASTE MANIFEST DOCUMENT NO. 74845

THIS SECTION TO BE COMPLETED BY GENERATOR:

COMPANY NAME	ADDRESS	PICK-UP DATE
Guyon General Piping, Inc.	900 S. 4th St.	12-12-88
	Harrison NJ 07029 (CITY / STATE / ZIP)	WASTE NO. 2534-3
NAME OR DESCRIPTION OF WASTE SHIPPED: Sand Blasting Grit		P.O. NO.

COMMENTS

GENERATOR ➡ OR AGENT ➡ MUST FILL ➡ IN QUANTITY ➡

QUANTITY SHIPPED: ONE LOAD

IN CASE OF AN EMERGENCY OR FOR ALL CONTACT	NAME	PHONE NO.	24-HR. EMERGENCY NO

I Hereby certify that the above named materials) are properly classified, described, packaged, marked, and labeled and are in proper condition for transportation according to the applicable regulations of the DOT and the EPA.

SIGNATURE: Woodrow Inhalb DATE: 12/11/8

THIS SECTION TO BE COMPLETED BY THE HAULER/TRANSPORTER:

COMPANY NAME	ADDRESS	PHONE NO.
HORWITH TRUCKS	RT 329 NORTHAMPTON PA 1067	215-261-2220
VEHICLE I.D. NO. / STATE	COMMENTS	

I Hereby certify that the above described wastes were accepted for transportation at the producer's site and delivered to and off loaded at the waste facility. Both as listed hereupon.

SIGNATURE (DRIVER): Carthur Liberty DATE:

THIS SECTION TO BE COMPLETED BY RECEIVER AT DISPOSAL SITE:

COMPANY NAME	ADDRESS	PHONE NO.
BROWNSTONE LANDFILL	7716 CHADD STSE WAYNESBURG, OH	216 759-7476
RECEIVER'S PERMIT NO. / COMMENTS		

I Hereby certify that the above described wastes were delivered to this Facility, that the Facility is authorized and permitted to receive such wastes.

AUTHORIZED SIGNATURE	CELL NO.	DATE

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SEE LANDFILL RULES AND REGULATIONS ON BACK

876970216

WEST HUDSON

836 HARRISON AVE.

KEARNY, N. J. 07032 TEL. 485-1216

Date 12/12/85 Weight 66 700

Name HORWITH

Name of Truck

Tractor Lic. No. 12CP

Trailer Lic. No. 153

Truck Lic. No.

CLEAR ☑
RAIN ☐
SNOW ☐

PAID 4.00 ROUND TRIP

CHARGE

Weighmaster [signature]

60065

Weight obtained by using THE HOWE PATENTED RECORDING BEAM No.

From To

39 700 Gross Load of

27 200 Tare Driver { ON OFF

66500 Net Fee Date 19

Weigher

876970217

AMERICAN WASTE SERVICES, INC.

C/O LIBERTY CENTRE - SUITE 7
3530 BELMONT AVE., YOUNGSTOWN, OHIO 44505 PHONE (216) 759-7476

NON-HAZARDOUS WASTE MANIFEST DOCUMENT NO. 7482F

THIS SECTION TO BE COMPLETED BY GENERATOR:

COMPANY NAME	ADDRESS	PICK-UP DATE
Guyon General Piping, Inc.	900 S. 6th St.	12-11-89
	Harrison NJ 07029 (CITY / STATE / ZIP)	WASTE NO. 2534-3

NAME OR DESCRIPTION OF WASTE SHIPPED: Sand Blasting Grit — P.O. NO.:

COMMENTS

GENERATOR ➡ OR AGENT ➡ MUST FILL ➡ IN QUANTITY ➡

QUANTITY SHIPPED: ONE LOAD

IN CASE OF AN EMERGENCY OR SPILL CONTACT	NAME	PHONE NO.	24-HR. EMERGENCY NO.

I hereby certify that the above named materials are properly classified, described, packaged, marked, and labeled and are in proper condition for transportation according to the applicable regulations of the DOT and the EPA.

SIGNATURE: [signature] DATE: 12/11/89

THIS SECTION TO BE COMPLETED BY THE HAULER/TRANSPORTER:

COMPANY NAME	ADDRESS	PHONE NO.
HORNITH TRUCKS	ROUTE 329 NORTHAMPTON, PA 18067	215-261-2221

VEHICLE I.D. NO. | STATE | COMMENTS

I hereby certify that the above described wastes were accepted for transportation at the producer's site and delivered to and off loaded at the waste facility. Both as listed hereupon.

SIGNATURE (DRIVER): [signature] DATE: 12.11.89

THIS SECTION TO BE COMPLETED BY RECEIVER AT DISPOSAL SITE:

COMPANY NAME	ADDRESS	PHONE NO.
BRITENSTINE LANDFILL	9916 Chapel St SE, WAYNESBURG, OH	216-735-74[illegible]

RECEIVERS PERMIT NO. | COMMENTS

I hereby certify that the above described wastes were delivered to this Facility, that the Facility is authorized and permitted to receive such wastes.

AUTHORIZED SIGNATURE | CELL NO. | DATE

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876970218

WEST HUDSON

936 HARRISON AVE.

KEARNY, N. J. 07032

TEL. 955-1216

Date 12-11-89 Weight 52710

Name HERWITH

Name of Truck

Tractor Lic. No.

Trailer Lic. No. # 1 3

Truck Lic. No.

CLEAR ☐

RAIN ☐

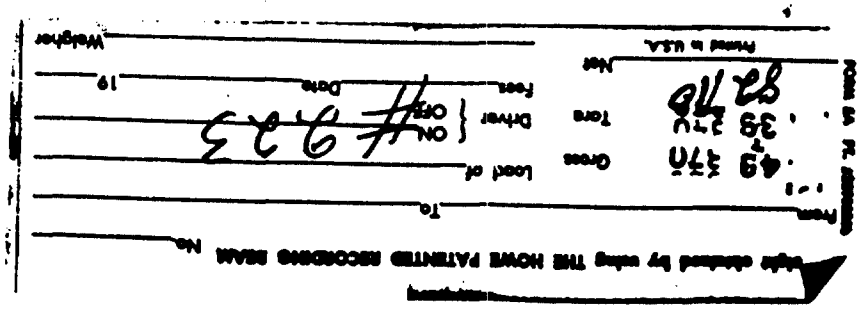
SNOW ☐

PAID ROUND TRIP

CHARGE

Weighmaster

59718



876970219

AMERICAN WASTE SERVICES, INC.

C/O LIBERTY CENTRE - SUITE 7
3530 BELMONT AVE., YOUNGSTOWN, OHIO 44505 PHONE (216) 759-7476

NON-HAZARDOUS WASTE MANIFEST DOCUMENT NO. 74827

THIS SECTION TO BE COMPLETED BY GENERATOR:

COMPANY NAME	ADDRESS	PICK-UP DATE
Guyon General Piping, Inc.	900 S. 4th St.	12-11-89
	Harrison NJ 07029 (CITY STATE ZIP)	WASTE NO. 2536-3
NAME OR DESCRIPTION OF WASTE SHIPPED: Sand Blasting Grit		P.O. NO.

COMMENTS

GENERATOR OR AGENT MUST FILL IN QUANTITY

QUANTITY SHIPPED: ONE LOAD

IN CASE OF AN EMERGENCY OR FAIL. CONTACT	NAME	PHONE NO.	24-HR. EMERGENCY NO.

I Hereby certify that the above named material(s) are properly classified, described, packaged, marked, and labeled and are in proper condition for transportation according to the applicable regulations of the DOT and the EPA.

SIGNATURE [signature] DATE 12/11/89

THIS SECTION TO BE COMPLETED BY THE HAULER/TRANSPORTER:

COMPANY NAME	ADDRESS	PHONE NO.
ACE WITH TRUCKS	RT 329 NORTHAMPTON, PA 18067	215 261-222
VEHICLE I.D. NO. / STATE	COMMENTS	

I Hereby certify that the above described wastes were accepted for transportation at the producer's site and delivered to and off loaded at the waste facility. Both as listed hereupon.

SIGNATURE (DRIVER) [signature] DATE 12/11/89

THIS SECTION TO BE COMPLETED BY RECEIVER AT DISPOSAL SITE:

COMPANY NAME	ADDRESS	PHONE NO.
KEYSTONE LANDFILL	7916 CHAPEL ST SE LAWNESBURG OH	216 759-7476
RECEIVER'S PERMIT NO. / COMMENTS		

I Hereby certify that the above described wastes were delivered to this Facility, that the Facility is authorized and permitted to receive such wastes.	AUTHORIZED SIGNATURE	CELL NO.	DATE

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SEE LANDFILL RULES AND REGULATIONS ON BACK

876970220

WEST HUDSON

936 HARRISON AVE.

KEARNY, N. J. 07032 TEL. 485-1216

Date 12/11-89 Weight 77970

Name Horvath

Name of Truck

Tractor Lic. No. # 209

Trailer Lic. No.

Truck Lic. No.

CLEAR ☐
RAIN ☐
SNOW ☐

PAID 4.00 ROUND TRIP

CHARGE

Weighmaster Transport Tag

59717

UARCO Business Forms

Weight obtained by using THE HOWE PATENTED RECORDING BEAM No.

From To

44 800 Gross Load of

33 170 Tare Driver { ON OFF

77970 Net Fees #209 Date 19

Printed in U.S.A.

Weigher

876970221

AMERICAN WASTE SERVICES, INC.

C/O LIBERTY CENTRE - SUITE 7
3530 BELMONT AVE., YOUNGSTOWN, OHIO 44505 PHONE (216) 759-7478

NON-HAZARDOUS WASTE MANIFEST DOCUMENT NO. 74828

THIS SECTION TO BE COMPLETED BY GENERATOR:

COMPANY NAME	ADDRESS	PICK-UP DATE
Guyon General Piping, Inc.	900 S. 4th St.	
	Harrison NJ 07029 (CITY / STATE / ZIP)	WASTE NO. 2534-3
NAME OR DESCRIPTION OF WASTE SHIPPED: Sand Blasting Grit		P.O. NO.

COMMENTS	GENERATOR ➡ OR AGENT ➡ MUST FILL ➡ IN QUANTITY ➡	QUANTITY SHIPPED
		ONE LOAD

IN CASE OF AN EMERGENCY OR SPILL, CONTACT	NAME	PHONE NO.	24-HR. EMERGENCY NO.

I Hereby certify that the above named material(s) are properly classified, described, packaged, marked, and labeled and are in proper condition for transportation according to the applicable regulations of the DOT and the EPA.

SIGNATURE [signature] DATE 12/11/89

THIS SECTION TO BE COMPLETED BY THE HAULER/TRANSPORTER:

COMPANY NAME	ADDRESS	PHONE NO.
HARWITH TRUCKS	RT 329 NORTHAMPTON PA 18067	215-261-3270
VEHICLE I.D. NO. / STATE	COMMENTS	

I Hereby certify that the above described wastes were accepted for transportation at the producer's site and delivered to and off loaded at the waste facility. Both as listed hereupon.

SIGNATURE (DRIVER) [signature] DATE 12-11-89

THIS SECTION TO BE COMPLETED BY RECEIVER AT DISPOSAL SITE:

COMPANY NAME	ADDRESS	PHONE NO.
BRISTOLINE LANDFILL	7916 CHAPEL ST SE WAYNESBURG OH	216 755-2116
RECEIVER'S PERMIT NO. / COMMENTS		

I Hereby certify that the above described wastes were delivered to this Facility, that the Facility is authorized and permitted to receive such wastes.	AUTHORIZED SIGNATURE	CELL NO.	DATE

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SEE LANDFILL RULES AND REGULATIONS ON BACK

876970222

WEST HUDSON

936 HARRISON AVE.

KEARNY, N. J. 07032

TEL. 485-1216

Date 12/4/89 Weight 75106

Name [illegible]

Name of Truck

Tractor Lic. No. # 232

Trailer Lic. No.

Truck Lic. No.

CLEAR ☒

RAIN ☐

SNOW ☐

PAID 4.00 ROUND TRIP

CHARGE

Weighmaster [illegible]

59716

Weight obtained by using THE HOWE PATENTED RECORDING BEAM No.

From To

41,510 Gross

33,710 Tare

75100 Net

Load of #232

Driver { ON / OFF

Fees Date 19

Weigher

FORM 84 PC. 4000000

Printed in U.S.A.

876970223

AMERICAN WASTE SERVICES, INC.

C/O LIBERTY CENTRE - SUITE 7
3530 BELMONT AVE., YOUNGSTOWN, OHIO 44505 PHONE (216) 759-7476

NON-HAZARDOUS WASTE MANIFEST DOCUMENT NO. 74829

THIS SECTION TO BE COMPLETED BY GENERATOR:

COMPANY NAME	ADDRESS	PICK-UP DATE
Guyon General Piping, Inc.	900 S. 4th St.	12-11-89
	Harrison NJ 07029 (CITY / STATE / ZIP)	WASTE NO. 2534-3

NAME OR DESCRIPTION OF WASTE SHIPPED: Sand Blasting Grit — P.O. NO:

COMMENTS

GENERATOR ➡ OR AGENT ➡ MUST FILL ➡ IN QUANTITY ➡ QUANTITY SHIPPED: ONE LOAD

IN CASE OF UN EMERGENCY OR SPILL, CONTACT	NAME	PHONE NO.	24-HR. EMERGENCY NO

I Hereby certify that the above named material(s) are properly classified, described, packaged, marked, and labeled and are in proper condition for transportation according to the applicable regulations of the DOT and the EPA. SIGNATURE: Gordon Turbeville DATE: 12/11/89

THIS SECTION TO BE COMPLETED BY THE HAULER/TRANSPORTER:

COMPANY NAME	ADDRESS	PHONE NO
JIMWITH TRUCKS	RT 329 NORTHAMPTON PA 18067	215 262 2223
VEHICLE ID NO. / STATE	COMMENTS	

I Hereby certify that the above described wastes were accepted for transportation at the producer's site and delivered to and off loaded at the waste facility both as listed hereupon. SIGNATURE (DRIVER): Ronald Stitz DATE: 12-11-89

THIS SECTION TO BE COMPLETED BY RECEIVER AT DISPOSAL SITE:

COMPANY NAME	ADDRESS	PHONE NO.
JOHNSTOWN LANDFILL	RR#4 CHAPEL ST S.E. WARREN OHIO	216 394-7476
RECEIVER'S PERMIT NO. / COMMENTS		

I Hereby certify that the above described wastes were delivered to this Facility, that the Facility is authorized and permitted to receive such wastes.	AUTHORIZED SIGNATURE	CELL NO.	DATE

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876970224

WEST HUDSON

836 HARRISON AVE.

KEARNY, N. J. 07032 TEL. 955-1216

Date 12-11-89 Weight 76418

Name HORVATH

Name of Truck

Tractor Lic. No.

Trailer Lic. No. # 233

Truck Lic. No.

CLEAR ☐

RAIN ☐ PAID 40 ROUND TRIP

SNOW ☐ CHARGE

Weighmaster Dwight Jones

59720

Weight obtained by using THE HOWE PATENTED RECORDING BEAM No.

From To

43 680 Gross Load of

32 770 Tare Driver # 233

76450 Net Fees Date 19

Weigher

FORM SA Printed in U.S.A.

876970225

AMERICAN WASTE SERVICES, INC.

C/O LIBERTY CENTRE - SUITE 7
3530 BELMONT AVE., YOUNGSTOWN, OHIO 44505 PHONE (216) 759-7476

NON-HAZARDOUS WASTE MANIFEST DOCUMENT NO. 74330

THIS SECTION TO BE COMPLETED BY GENERATOR:

COMPANY NAME	ADDRESS	PICK-UP DATE
Guyon General Piping, Inc.	900 S. 4th St.	12-11-89
	Harrison NJ 07029 (CITY / STATE / ZIP)	WASTE NO. 2534-3

NAME OR DESCRIPTION OF WASTE SHIPPED: Sand Blasting Grit

P.O. NO.:

COMMENTS

GENERATOR OR AGENT MUST FILL IN QUANTITY ➡ QUANTITY SHIPPED: ONE LOAD

IN CASE OF AN EMERGENCY OR FOR L. CONTACT	NAME	PHONE NO.	24-HR. EMERGENCY NO.

I hereby certify that the above named materials are properly classified, described, packaged, marked, and labeled and are in proper condition for transportation according to the applicable regulations of the DOT and the EPA.

SIGNATURE: Sheldon Takelg DATE: 12/11/89

THIS SECTION TO BE COMPLETED BY THE HAULER/TRANSPORTER:

COMPANY NAME	ADDRESS	PHONE NO.
HARWITH TRUCKS	RT 329 NORTHAMPTON PA 18067	215 261 2220

VEHICLE I.D. NO. | STATE | COMMENTS

I Hereby certify that the above described wastes were accepted for transportation at the producer's site and delivered to and off loaded at the waste facility. Both as listed hereupon.

SIGNATURE (DRIVER): A. Fritz DATE: 12-11-89

THIS SECTION TO BE COMPLETED BY RECEIVER AT DISPOSAL SITE:

COMPANY NAME	ADDRESS	PHONE NO.
RIVERSIDE LANDFILL	7116 CHAPEL ST SE WARREN OH	216 847 7476

RECEIVER'S PERMIT NO. | COMMENTS

I Hereby certify that the above described wastes were delivered to this Facility, that the Facility is authorized and permitted to receive such wastes.

AUTHORIZED SIGNATURE | CELL NO. | DATE

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SEE LANDFILL RULES AND REGULATIONS ON BACK

876970226

WEST HUDSON

936 HARRISON AVE.

KEARNY, N. J. 07032 TEL. 466-1216

Date 12-11-89 Weight 81.470

Name HORWORTH

Name of Truck

Tractor Lic. No.

Trailer Lic. No. 210

Truck Lic. No.

CLEAR ☐
RAIN ☐
SNOW ☐

PAID 400 ROUND TRIP

CHARGE

Weighmaster Raymond Terry

59719

UNICO Business Forms

Weight obtained by using THE HOWE PATENTED RECORDING BEAM No.

From To

Gross 81 440

Tare 37 970

Net 43 470

Load of

Driver { ON OFF 210

Fees Date 19

Weigher

FORM SA PC

Printed in U.S.A.

876970227

AMERICAN WASTE SERVICES, INC.

C/O LIBERTY CENTRE - SUITE 7
3530 BELMONT AVE., YOUNGSTOWN, OHIO 44505 PHONE (216) 759-7476

NON-HAZARDOUS WASTE MANIFEST DOCUMENT NO. 74831

THIS SECTION TO BE COMPLETED BY GENERATOR:

COMPANY NAME	ADDRESS	PICK-UP DATE
Guyon General Piping, Inc.	900 S. 4th St.	
	Harrison NJ 07029 (CITY / STATE / ZIP)	WASTE NO. 2534-3
NAME OR DESCRIPTION OF WASTE SHIPPED: Sand Blasting Grit		P.O. NO.

COMMENTS

GENERATOR ➡ OR AGENT ➡ MUST FILL ➡ IN QUANTITY ➡

QUANTITY SHIPPED: ONE LOAD

IN CASE OF AN EMERGENCY OR SPILL CONTACT	NAME	PHONE NO.	24-HR. EMERGENCY NO.

I hereby certify that the above named material(s) are properly classified, described, packaged, marked, and labeled and are in proper condition for transportation according to the applicable regulations of the DOT and the EPA. SIGNATURE: [signature] DATE: 12/11/88

THIS SECTION TO BE COMPLETED BY THE HAULER/TRANSPORTER:

COMPANY NAME	ADDRESS	PHONE NO.
HORWITH TRUCKS	RT 329 NORTHAMPTON PA 18067	215-261-2220
VEHICLE I.D. NO. / STATE	COMMENTS	

I Hereby certify that the above described wastes were accepted for transportation at the producer's site and delivered to and off loaded at the waste facility. Both as listed hereupon. SIGNATURE (DRIVER): [signature] DATE:

THIS SECTION TO BE COMPLETED BY RECEIVER AT DISPOSAL SITE:

COMPANY NAME	ADDRESS	PHONE NO.
KELLYSTONE LANDFILL	7116 CHAPEL ST SE WAYNESBURG OH	216 854-7476
RECEIVER'S PERMIT NO. / COMMENTS		

I Hereby certify that the above described wastes were delivered to this Facility, that the Facility is authorized and permitted to receive such wastes.

AUTHORIZED SIGNATURE	CELL NO.	DATE

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876970228

WEST HUDSON

836 HARRISON AVE.

KEARNY, N. J. 07032 TEL. [illegible]-1216

Date 12/11/89 Weight 81810

Name HORVATH

Name of Truck

Tractor Lic. No.

Trailer Lic. No. # 222

Truck Lic. No.

CLEAR ☐
RAIN ☐
SNOW ☐

PAID 400 ROUND TRIP

CHARGE

Weighmaster Dwight Jay

59723

Weight obtained by using THE HOWE PATENTED RECORDING BEAM No.

From To

45 210 Gross
36 600 Tare
81 810 Net

Load of

Driver { ON / OFF } 222

Fees Date 19

Weigher

Printed in U.S.A.

876970229

AMERICAN WASTE SERVICES, INC.

C/O LIBERTY CENTRE - SUITE 7
3530 BELMONT AVE., YOUNGSTOWN, OHIO 44505 PHONE (216) 759-7476

NON-HAZARDOUS WASTE MANIFEST DOCUMENT NO. 74832

THIS SECTION TO BE COMPLETED BY GENERATOR:

COMPANY NAME	ADDRESS	PICK-UP DATE
Guyon General Piping, Inc.	900 S. 4th St.	12-11-89
	Harrison NJ 07029 (CITY / STATE / ZIP)	WASTE NO. 2534-3

NAME OR DESCRIPTION OF WASTE SHIPPED: Sand Blasting Grit — P.O. NO.:

COMMENTS

GENERATOR OR AGENT MUST FILL IN QUANTITY ➡ QUANTITY SHIPPED: ONE LOAD

IN CASE OF AN EMERGENCY OR SPILL, CONTACT	NAME	PHONE NO.	24-HR. EMERGENCY NO.

I Hereby certify that the above named material(s) are properly classified, described, packaged, marked, and labeled and are in proper condition for transportation according to the applicable regulations of the DOT and the EPA. SIGNATURE: [signature] DATE:

THIS SECTION TO BE COMPLETED BY THE HAULER/TRANSPORTER:

COMPANY NAME	ADDRESS	PHONE NO.
HORVATH TRUCKS	RT 329 NORTHAMPTON PA 18067	215 261-2220
VEHICLE I.D. NO. / STATE	COMMENTS	

I Hereby certify that the above described wastes were accepted for transportation at the producer's site and delivered to and off loaded at the waste facility. Both as listed hereupon. SIGNATURE (DRIVER): [signature] DATE: 12/11/89

THIS SECTION TO BE COMPLETED BY RECEIVER AT DISPOSAL SITE:

COMPANY NAME	ADDRESS	PHONE NO.
BRIDGESTONE LANDFILL	7116 CHURCH ST. SE. WAYNESBURG OH	216 253-2476
RECEIVER'S PERMIT NO. / COMMENTS		

I Hereby certify that the above described wastes were delivered to this Facility, that the Facility is authorized and permitted to receive such wastes.	AUTHORIZED SIGNATURE	CELL NO.	DATE

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GENERATOR - COPY 1

SEE LANDFILL RULES AND REGULATIONS ON BACK

876970230

WEST HUDSON

816 HARRISON AVE.

KEARNY, N. J. 07032 TEL. [illegible]-1216

Date 12/1/89 Weight 82-720

Name HORVATH

Name of Truck

Tractor Lic. No.

Trailer Lic. No. # 200

Truck Lic. No.

CLEAR ☒

RAIN ☐

SNOW ☐

PAID 400 ROUND TRIP

CHARGE

Weighmaster Ruzin Tony

59724

Weight obtained by using THE HOWE PATENTED RECORDING BEAM No.

From To

45 540 Gross Load of

37 080 Tare Driver { ON OFF # 200

82720 Net Fees Date 19

Printed in U.S.A.

Weigher

876970231

AMERICAN WASTE SERVICES, INC.

C/O LIBERTY CENTRE - SUITE 7
3530 BELMONT AVE., YOUNGSTOWN, OHIO 44505 PHONE (216) 759-7476

NON-HAZARDOUS WASTE MANIFEST DOCUMENT NO. 74833

THIS SECTION TO BE COMPLETED BY GENERATOR:

COMPANY NAME	ADDRESS	PICK-UP DATE
Guyon General Piping, Inc.	900 S. 4th St.	12-11-89
	Harrison NJ 07029 (CITY / STATE / ZIP)	WASTE NO. 2536-3

NAME OR DESCRIPTION OF WASTE SHIPPED: Sand Blasting Grit — P.O. NO.:

COMMENTS

GENERATOR OR AGENT MUST FILL IN QUANTITY ➡ QUANTITY SHIPPED: ONE LOAD

IN CASE OF AN EMERGENCY OR ... CONTACT	NAME	PHONE NO.	24-HR. EMERGENCY NO.

I Hereby certify that the above named material(s) are properly classified, described, packaged, marked, and labeled and are in proper condition for transportation according to the applicable regulations of the DOT and the EPA. — SIGNATURE: David Falk — DATE: 12-11-89

THIS SECTION TO BE COMPLETED BY THE HAULER/TRANSPORTER:

COMPANY NAME	ADDRESS	PHONE NO.
HARWITH TRUCKS	RT 329 NORTHAMPTON PA 18067	215 261-2220
VEHICLE I.D. NO. / STATE	COMMENTS	

I Hereby certify that the above described wastes were accepted for transportation at the producer's site and delivered to and off loaded at the waste facility. Both as listed hereupon. — SIGNATURE (DRIVER): Theodore Tulodzi — DATE: 12/11/89

THIS SECTION TO BE COMPLETED BY RECEIVER AT DISPOSAL SITE:

COMPANY NAME	ADDRESS	PHONE NO.
RITA/STINE LANDFILL	7516 CHARDON ST. SE WAYNESBURG, OH	216 857-1476
RECEIVER'S PERMIT NO.	COMMENTS	

I Hereby certify that the above described wastes were delivered to this Facility, that the Facility is authorized and permitted to receive such wastes. — AUTHORIZED SIGNATURE — CELL NO. — DATE

GENERATOR: Copies 1 & 6 AMERICAN WASTE SERVICES, INC: Copies 2 & 3 RECEIVER: Copy 4 HAULER: Copy 5

GENERATOR - COPY 1

SEE LANDFILL RULES AND REGULATIONS ON BACK

876970232

WEST HUDSON

836 HARRISON AVE.

KEARNY, N. J. 07032 TEL. 955-1216

Date 12/1/89 Weight 82050

Name HORWITH

Name of Truck

Tractor Lic. No.

Trailer Lic. No. # 217

Truck Lic. No.

CLEAR ☐
RAIN ☐
SNOW ☐

PAID 400 ROUND TRIP

CHARGE

Weighmaster Dup / Tare

59725

Weight obtained by using THE HOWE PATENTED RECORDING BEAM No.

From To

44 400 Gross Load of

38000 Tare Driver { On / Off # 217

82050 Net Fees Date 19

Weigher

FORM 54 Ft. 2000

Printed in U.S.A.

876970233

AMERICAN WASTE SERVICES, INC.

C/O LIBERTY CENTRE - SUITE 7
3530 BELMONT AVE., YOUNGSTOWN, OHIO 44505 PHONE (216) 759-7476

NON-HAZARDOUS WASTE MANIFEST DOCUMENT NO. 74831

THIS SECTION TO BE COMPLETED BY GENERATOR:

COMPANY NAME	ADDRESS	PICK-UP DATE
Guyon General Piping, Inc.	900 S. 4th St.	12-N-S-5
	Harrison NJ 07029 (CITY / STATE / ZIP)	WASTE NO. 2536-3

NAME OR DESCRIPTION OF WASTE SHIPPED: Sand Blasting Grit — P.O. NO.:

COMMENTS:

GENERATOR OR AGENT MUST FILL IN QUANTITY

QUANTITY SHIPPED: ONE LOAD

IN CASE OF AN EMERGENCY OR SPILL, CONTACT	NAME	PHONE NO.	24-HR. EMERGENCY NO.

I Hereby certify that the above named material(s) are properly classified, described, packaged, marked, and labeled and are in proper condition for transportation according to the applicable regulations of the DOT and the EPA. SIGNATURE: Jeffrey Scott #203 #190 DATE:

THIS SECTION TO BE COMPLETED BY THE HAULER/TRANSPORTER:

COMPANY NAME	ADDRESS	PHONE NO.
HORWITH TRUCKS	RT 329 NORTHAMPTON PA 18067	215-262-2220
VEHICLE I.D. NO. / STATE	COMMENTS	

I Hereby certify that the above described wastes were accepted for transportation at the producer's site and delivered to and off loaded at the waste facility. Both as listed hereupon. SIGNATURE (DRIVER): [signature] DATE: 12/11/89

THIS SECTION TO BE COMPLETED BY RECEIVER AT DISPOSAL SITE:

COMPANY NAME	ADDRESS	PHONE NO.
BRITTAINE LANDFILL	7116 CHAPEL ST SE WAYNESBURG OH	216-852-4476
RECEIVER'S PERMIT NO. / COMMENTS		

I Hereby certify that the above described wastes were delivered to this Facility, that the Facility is authorized and permitted to receive such wastes. AUTHORIZED SIGNATURE: CELL NO.: DATE:

GENERATOR: Copies 1 & 6 — AMERICAN WASTE SERVICES, INC.: Copies 2 & 3 — RECEIVER: Copy 4 — HAULER: Copy 5

GENERATOR - COPY 1

SEE LANDFILL RULES AND REGULATIONS ON BACK

876970234

WEST HUDSON

936 HARRISON AVE.

KEARNY, N. J. 07032 TEL. [illegible]-1216

Date 12/11/89 Weight 82130

Name HORKUFFTH

Name of Truck

Tractor Lic. No.

Trailer Lic. No. #203

Truck Lic. No.

CLEAR ☐
RAIN ☐
SNOW ☐

PAID 400 ROUND TRIP

CHARGE

Weighmaster Raymond Fay

59727

UARCO Business Forms

Weight obtained by using THE HOWE PATENTED RECORDING BEAM No.

From To

46 340 Gross
35 790 Tare
82130 Net

Load of #203

Driver { ON / OFF

Fees Date 19

Weigher

FORM 84 PC. REVISED

Printed in U.S.A.

876970235

AMERICAN WASTE SERVICES, INC.

C/O LIBERTY CENTRE - SUITE 7
. 3530 BELMONT AVE., YOUNGSTOWN, OHIO 44505 PHONE (216) 759-7476

NON-HAZARDOUS WASTE MANIFEST DOCUMENT NO. 74835

THIS SECTION TO BE COMPLETED BY GENERATOR:

COMPANY NAME	ADDRESS	PICK-UP DATE
Guyon General Piping, Inc.	900 S. 4th St.	12-11-85
	Harrison NJ 07029 (CITY / STATE / ZIP)	WASTE NO. 2534-3
NAME OR DESCRIPTION OF WASTE SHIPPED: Sand Blasting Grit		P.O. NO.

COMMENTS

GENERATOR OR AGENT MUST FILL IN QUANTITY → QUANTITY SHIPPED: ONE LOAD

IN CASE OF AN EMERGENCY OR SPILL CONTACT	NAME	PHONE NO.	24-HR. EMERGENCY NO.

I hereby certify that the above named material(s) are properly classified, described, packaged, marked, and labeled and are in proper condition for transportation according to the applicable regulations of the DOT and the EPA. SIGNATURE: [signature] DATE: 12/11/85

THIS SECTION TO BE COMPLETED BY THE HAULER/TRANSPORTER:

COMPANY NAME	ADDRESS	PHONE NO.
HORWITH TRUCKS	RT 329 NORTHAMPTON, PA 18067	215-261-2221
VEHICLE I.D. NO. / STATE	COMMENTS	

I Hereby certify that the above described wastes were accepted for transportation at the producer's site and delivered to and off loaded at the waste facility. Both as listed hereupon. SIGNATURE (DRIVER): Norman P. Rue DATE: 12/11/85

THIS SECTION TO BE COMPLETED BY RECEIVER AT DISPOSAL SITE:

COMPANY NAME	ADDRESS	PHONE NO.
RIDGEFILL LANDFILL	7716 CHAPEL ST. S.E. WAYNESBURG, OH	216 758-7476
RECEIVER'S PERMIT NO. / COMMENTS		

I Hereby certify that the above described wastes were delivered to this Facility, that the Facility is authorized and permitted to receive such wastes. AUTHORIZED SIGNATURE | CELL NO. | DATE

GENERATOR: Copies 1 & 6 — AMERICAN WASTE SERVICES, INC.: Copies 2 & 3 — RECEIVER: Copy 4 — HAULER: Copy 5

GENERATOR - COPY 1

SEE LANDFILL RULES AND REGULATIONS ON BACK

876970236

WEST HUDSON

936 HARRISON AVE.

KEARNY, N. J. 07032 TEL. [illegible]-1216

Date 12-11-89 Weight 80250 LA

Name [illegible]

Name of Truck Harrison 117

Tractor Lic. No. 567

Trailer Lic. No. 187

Truck Lic. No. [illegible]

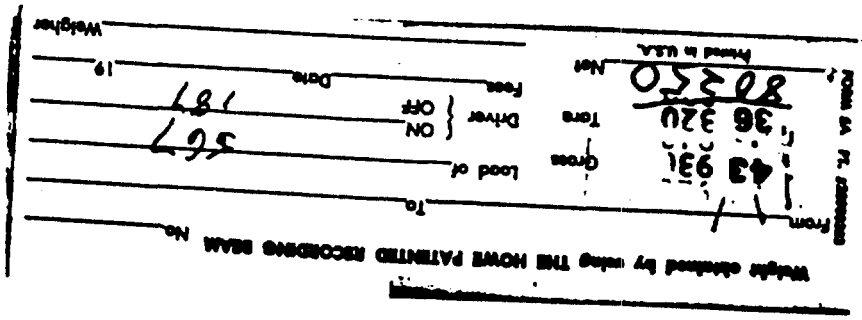
CLEAR ☐
RAIN ☐
SNOW ☐

PAID 4.00 ROUND TRIP

CHARGE

Weighmaster [illegible]

59729



876970237

AMERICAN WASTE SERVICES, INC.

C/O LIBERTY CENTRE - SUITE 7
3530 BELMONT AVE., YOUNGSTOWN, OHIO 44505 PHONE (216) 759-7476

NON-HAZARDOUS WASTE MANIFEST DOCUMENT NO. 74837

THIS SECTION TO BE COMPLETED BY GENERATOR:

COMPANY NAME	ADDRESS	PICK-UP DATE
Guyon General Piping, Inc.	900 S. 4th St.	12-11-87
	Harrison NJ 07029 (CITY / STATE / ZIP)	WASTE NO. 2536-3

NAME OR DESCRIPTION OF WASTE SHIPPED: Sand Blasting Grit — P.O. NO.:

COMMENTS

GENERATOR ➡ OR AGENT ➡ MUST FILL ➡ IN QUANTITY ➡ QUANTITY SHIPPED: ONE LOAD

IN CASE OF AN EMERGENCY OR SPILL CONTACT	NAME	PHONE NO.	24-HR. EMERGENCY NO.

I Hereby certify that the above named materials) are properly [illegible], described, packaged, marked, and labeled and are [illegible] proper condition for transportation according to the applicable regulations of the DOT and the EPA. SIGNATURE: [signature] DATE: 12/11/87

THIS SECTION TO BE COMPLETED BY THE HAULER/TRANSPORTER:

COMPANY NAME	ADDRESS	PHONE NO.
HORWITH TRUCKS	RT 529 NORTHAMPTON PA 18067	215-262-1222
VEHICLE I.D. NO. / STATE	COMMENTS	

I Hereby certify that the above described wastes were accepted for transportation at the producer's site and delivered to and off loaded at the waste facility both as listed hereupon. SIGNATURE (DRIVER): Tim Hartman DATE: 12-11-87

THIS SECTION TO BE COMPLETED BY RECEIVER AT DISPOSAL SITE:

COMPANY NAME	ADDRESS	PHONE NO.
BUTLER LANDFILL	R16 CHAPEL ST SE WAYNESBURG, OH 44688	216-857-2411
RECEIVER'S PERMIT NO. / COMMENTS		

I Hereby certify that the above described wastes were delivered to this Facility, that the Facility is authorized and permitted to receive such wastes.	AUTHORIZED SIGNATURE	CELL NO.	DATE

GENERATOR: Copies 1 & 6 — AMERICAN WASTE SERVICES, INC: Copies 2 & 3 — RECEIVER: Copy 4 — HAULER: Copy 5

GENERATOR - COPY 1

SEE LANDFILL RULES AND REGULATIONS ON BACK

876970238

WEST HUDSON

936 HARRISON AVE.

KEARNY, N. J. 07032 TEL. 995-1216

Date 2/11/89 Weight 78910 GR.

Name W.H.T.

Name of Truck Horwith

Tractor Lic. No. 229

Trailer Lic. No. 108

Truck Lic. No. 4

CLEAR ☑ PAID 400 ROUND TRIP

RAIN ☐

SNOW ☐ CHARGE

Weighmaster Raymond Tinley

59730

Weight obtained by using THE HOWE PATENTED RECORDING BEAM No.

From To

78 750 Gross Load of

35 160 Tare Driver { ON 229 OFF 108

7491 Net Fees Date 19

Weigher

FORM 84 Printed in U.S.A.

876970239

AMERICAN WASTE SERVICES, INC.

C/O LIBERTY CENTRE - SUITE 7
3530 BELMONT AVE., YOUNGSTOWN, OHIO 44505 PHONE (216) 759-7476

NON-HAZARDOUS WASTE MANIFEST DOCUMENT NO. 74833

THIS SECTION TO BE COMPLETED BY GENERATOR:

COMPANY NAME	ADDRESS	PICK-UP DATE
Guyon General Piping, Inc.	900 S. 4th St.	12.11.89
	Harrison NJ 07029 (CITY / STATE / ZIP)	WASTE NO. 2534-3

NAME OR DESCRIPTION OF WASTE SHIPPED: Sand Blasting Grit — P.O. NO.:

COMMENTS:

GENERATOR ➡ OR AGENT ➡ MUST FILL ➡ IN QUANTITY ➡ QUANTITY SHIPPED: ONE LOAD

IN CASE OF AN EMERGENCY OR SPILL, CONTACT	NAME	PHONE NO.	24-HR. EMERGENCY NO.

I Hereby certify that the above named material(s) are properly classified, described, packaged, marked, and labeled and are in proper condition for transportation according to the applicable regulations of the DOT and the EPA. SIGNATURE: [signature] DATE: 12/11/89

THIS SECTION TO BE COMPLETED BY THE HAULER/TRANSPORTER:

COMPANY NAME	ADDRESS	PHONE NO.
HORVATH TRUCKS	RT 329 NORTHAMPTON PA 18067	215-261-1222

VEHICLE I.D. NO. | STATE | COMMENTS

I Hereby certify that the above described wastes were accepted for transportation at the producer's site and delivered to and off loaded at the waste facility both as listed hereupon. SIGNATURE (DRIVER): [signature] DATE: 12/11/89

THIS SECTION TO BE COMPLETED BY RECEIVER AT DISPOSAL SITE:

COMPANY NAME	ADDRESS	PHONE NO.
CUYAHOGA STONE LANDFILL	7916 CHAGRIN ST S.E. WAYNESBURG OH	216-759-7476

RECEIVERS PERMIT NO. | COMMENTS

Hereby certify that the above described wastes were delivered to this Facility, that the Facility is authorized and permitted to receive such wastes. AUTHORIZED SIGNATURE | CELL NO. | DATE

GENERATOR: Copies 1 & 6 — AMERICAN WASTE SERVICES, INC: Copies 2 & 3 — RECEIVER: Copy 4 — HAULER: Copy 5

GENERATOR - COPY 1

SEE LANDFILL RULES AND REGULATIONS ON BACK

876970240

WEST HUDSON

936 HARRISON AVE.

KEARNY, N. J. 07032 TEL. [illegible]-1216

Date 12/11/89 Weight 81270

Name J. HORVATH

Name of Truck

Tractor Lic. No.

Trailer Lic. No. # 218

Truck Lic. No.

CLEAR ☑

RAIN ☐

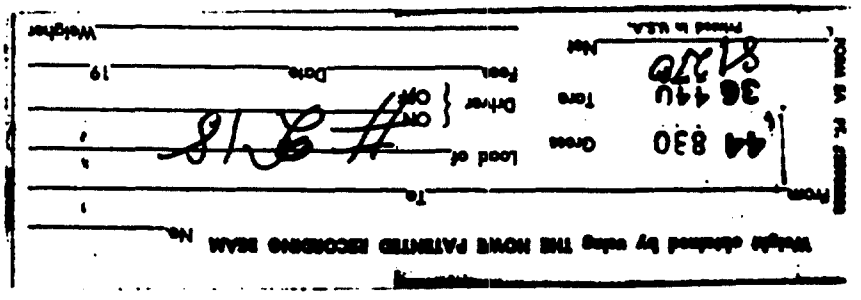
SNOW ☐

PAID 4.00 ROUND TRIP

CHARGE

Weighmaster [signature]

59732



876970241

AMERICAN WASTE SERVICES, INC.

C/O LIBERTY CENTRE - SUITE 7
3530 BELMONT AVE., YOUNGSTOWN, OHIO 44505 PHONE (216) 759-7476

NON-HAZARDOUS WASTE MANIFEST DOCUMENT NO. 74839

THIS SECTION TO BE COMPLETED BY GENERATOR:

COMPANY NAME	ADDRESS	PICK-UP DATE
Guyon General Piping, Inc.	900 S. 4th St.	12-11-89
	Harrison NJ 07029 (CITY / STATE / ZIP)	WASTE NO. 2534-3

NAME OR DESCRIPTION OF WASTE SHIPPED	P.O. NO.
Sand Blasting Grit	

COMMENTS	GENERATOR ➡ OR AGENT ➡ MUST FILL ➡ IN QUANTITY ➡	QUANTITY SHIPPED
		ONE LOAD

IN CASE OF AN EMERGENCY OR SPILL CONTACT	NAME	PHONE NO.	24-HR. EMERGENCY NO

I Hereby certify that the above named material(s) are properly classified, described, packaged, marked, and labeled and are in proper condition for transportation according to the applicable regulations of the DOT and the EPA. SIGNATURE [signature] DATE 12/11/89

THIS SECTION TO BE COMPLETED BY THE HAULER/TRANSPORTER:

COMPANY NAME	ADDRESS	PHONE NO.
HACKWITH TRUCKS	RT 329 NORTHAMPTON PA 18067	215-261-22

VEHICLE I.D. NO.	STATE	COMMENTS

I Hereby certify that the above described wastes were accepted for transportation at the producer's site and delivered to and off loaded at the waste facility. Both as listed hereupon. SIGNATURE (DRIVER) [signature] DATE 12/11/89

THIS SECTION TO BE COMPLETED BY RECEIVER AT DISPOSAL SITE:

COMPANY NAME	ADDRESS	PHONE NO.
REPUBLIC LANDFILL	7716 CHADEN ST SE WAYNESBURG OH	216-854-7176

RECEIVERS PERMIT NO.	COMMENTS

I Hereby certify that the above described wastes were delivered to this Facility, that the Facility is authorized and permitted to receive such wastes.	AUTHORIZED SIGNATURE	CELL NO.	DATE

GENERATOR: Copies 1 & 6 AMERICAN WASTE SERVICES, INC: Copies 2 & 3 RECEIVER: Copy 4 HAULER: Copy 5

GENERATOR - COPY 1

SEE LANDFILL RULES AND REGULATIONS ON BACK

876970242

WEST HUDSON

836 HARRISON AVE.

KEARNY, N. J. 07032 TEL. [illegible]-1216

Date 12/11/89 Weight 82340 Lbs

Name

Name of Truck Horwith

Tractor Lic. No. 224

Trailer Lic. No. 179

Truck Lic. No.

CLEAR ☒ RAIN ☐ SNOW ☐

PAID 4.00 ROUND TRIP

CHARGE

Weighmaster Raymond Fiala

59735

Weight obtained by using THE HOWE PATENTED RECORDING BEAM No.

From To

45 220	Gross	Load of	#224
36 800	Tare	Driver ON / OFF	179
8234	Net	Fees Date 19	
			Weigher

876970243

AMERICAN WASTE SERVICES, INC.

C/O LIBERTY CENTRE - SUITE 7
3530 BELMONT AVE. YOUNGSTOWN, OHIO 44505 PHONE (216) 759-7476

NON-HAZARDOUS WASTE MANIFEST DOCUMENT NO. 74840

THIS SECTION TO BE COMPLETED BY GENERATOR:

COMPANY NAME	ADDRESS	PICK-UP DATE
Guyon General Piping, Inc.	900 S. 4th St.	12 11 89
	Harrison NJ 07029 (CITY STATE ZIP)	WASTE NO. 2536-3

NAME OR DESCRIPTION OF WASTE SHIPPED	P.O. NO.
Sand Blasting Grit	

COMMENTS	GENERATOR OR AGENT MUST FILL IN QUANTITY	QUANTITY SHIPPED
		ONE LOAD

IN CASE OF AN EMERGENCY OR FOR CONTACT	NAME	PHONE NO.	24-HR. EMERGENCY NO.

I hereby certify that the above named material(s) are properly classified, described, packaged, marked, and labeled and are in proper condition for transportation according to the applicable regulations of the DOT and the EPA.

SIGNATURE [signature] DATE 12/11/89

THIS SECTION TO BE COMPLETED BY THE HAULER/TRANSPORTER:

COMPANY NAME	ADDRESS	PHONE NO.
FORWITH TRUCKS	RT 329 NORTHAMPTON PA 18067	215 261 2225

VEHICLE I.D. NO.	STATE	COMMENTS

I hereby certify that the above described wastes were received for transportation at the producer's site and delivered to and off loaded at the waste facility as listed hereupon.

SIGNATURE (DRIVER) [signature] DATE

THIS SECTION TO BE COMPLETED BY RECEIVER AT DISPOSAL SITE:

COMPANY NAME	ADDRESS	PHONE NO.
WESTSTONE LANDFILL	7916 CHARLES ST SE WAYNESBURG OH	216 339-7471

DRIVER'S PERMIT NO.	COMMENTS

I hereby certify that the above described wastes were delivered to this Facility, that the Facility is authorized and permitted to receive such wastes.

AUTHORIZED SIGNATURE	CELL NO.	DATE

GENERATOR: Copies 1 & 6 AMERICAN WASTE SERVICES, INC: Copies 2 & 3 RECEIVER: Copy 4 HAULER: Copy 5

GENERATOR - COPY 1

SEE LANDFILL RULES AND REGULATIONS ON BACK

876970244

WEST HUDSON

936 HARRISON AVE.

KEARNY, N. J. 07032 TEL. [illegible]-1216

Date 12/14/89 Weight 80480 LT

Name

Name of Truck HOAGLAND

Tractor Lic. No. 228

Trailer Lic. No. 194

Truck Lic. No.

CLEAR ☐ PAID ROUND TRIP

RAIN ☐

SNOW ☐ CHARGE

Weighmaster Dump Fee

59733

Weight obtained by using THE HOWE PATENTED RECORDING BEAM No.

From To

45 240 Gross Load of 228

34 910 Tare Driver { ON 194 OFF

80480 Net Fees Date 19

Printed in U.S.A. Weigher

876970245

AMERICAN WASTE SERVICES, INC.

C/O LIBERTY CENTRE - SUITE 7
3530 BELMONT AVE., YOUNGSTOWN, OHIO 44505 PHONE (216) 759-7476

NON-HAZARDOUS WASTE MANIFEST

DOCUMENT NO. 74841

THIS SECTION TO BE COMPLETED BY GENERATOR:

COMPANY NAME	ADDRESS	PICK-UP DATE
Guyon General Piping, Inc.	900 S. 4th St.	12-11-85
	Harrison NJ 07029 (CITY STATE ZIP)	WASTE NO. 2536-3

NAME OR DESCRIPTION OF WASTE SHIPPED: Sand Blasting Grit — P.O. NO.

COMMENTS

GENERATOR ➡ OR AGENT ➡ MUST FILL ➡ IN QUANTITY ➡

QUANTITY SHIPPED: ONE LOAD

IN CASE OF AN EMERGENCY OR SPILL CONTACT	NAME	PHONE NO.	24-HR. EMERGENCY NO.

I hereby certify that the above named material(s) are properly classified, described, packaged, marked, and labeled and are in proper condition for transportation according to the applicable regulations of the DOT and the EPA. SIGNATURE: Gordon Lubelski DATE: 12/11/85

THIS SECTION TO BE COMPLETED BY THE HAULER/TRANSPORTER:

COMPANY NAME	ADDRESS	PHONE NO
HORWITH TRUCKS	RT 529 NORTHAMPTON PA 18067	215-262-6220

VEHICLE I.D. NO.	STATE	COMMENTS

I Hereby certify that the above described wastes were accepted for transportation at the producer's site and delivered to and off loaded at the waste facility. Both as listed hereupon. SIGNATURE (DRIVER): Andrew J Pelly DATE:

THIS SECTION TO BE COMPLETED BY RECEIVER AT DISPOSAL SITE:

COMPANY NAME	ADDRESS	PHONE NO.
BETTERSTINE LANDFILL	7916 CHARDON RD WAYNESBURG OH 216 857-7122	

RECEIVER'S PERMIT NO.	COMMENTS

I Hereby certify that the above described wastes were delivered to this Facility, that the Facility is authorized and permitted to receive such wastes.

AUTHORIZED SIGNATURE	CELL NO.	DATE

GENERATOR: Copies 1 & 6 — AMERICAN WASTE SERVICES, INC: Copies 2 & 3 — RECEIVER: Copy 4 — HAULER: Copy 5

GENERATOR - COPY 1

SEE LANDFILL RULES AND REGULATIONS ON BACK

876970246

WEST HUDSON

936 HARRISON AVE.

KEARNY, N. J. 07032 TEL. [illegible]5-1216

Date 12/11/89 Weight 82610 GR

Name

Name of Truck Hoel w/ Tk

Tractor Lic. No. 231

Trailer Lic. No. 193

Truck Lic. No.

CLEAR ☑

RAIN ☐

SNOW ☐

PAID $4.00 ROUND TRIP

CHARGE

Weighmaster [signature]

59734

Weighs obtained by using THE NOWE PATENTED RECORDING BEAM No.

From [illegible] To

Gross 82 250 Load of 231

Tare 38 360 Driver ON OFF

Net 80210 Made in U.S.A.

Date 193 19

Weigher

876970247

AMERICAN WASTE SERVICES, INC.

C/O LIBERTY CENTRE - SUITE 7
3530 BELMONT AVE., YOUNGSTOWN, OHIO 44505 PHONE (216) 759-7476

NON-HAZARDOUS WASTE MANIFEST DOCUMENT NO. 74842

SECTION TO BE COMPLETED BY GENERATOR:

COMPANY NAME	ADDRESS	PICK-UP DATE
Guyon General Piping, Inc.	900 S. 4th St.	12-11-89
	CITY Harrison STATE NJ ZIP 07029	WASTE NO. 2536-3
NAME OR DESCRIPTION OF WASTE SHIPPED: Sand Blasting Grit		P.O. NO.

COMMENTS

GENERATOR OR AGENT MUST FILL IN QUANTITY

QUANTITY SHIPPED: ONE LOAD

IN CASE OF AN EMERGENCY OR SPILL CONTACT	NAME	PHONE NO.	24-HR. EMERGENCY NO.

I Hereby certify that the above named material(s) are properly classified, described, packaged, marked, and labeled and are in proper condition for transportation according to the applicable regulations of the DOT and the EPA. SIGNATURE [signature] DATE 12/11/89

THIS SECTION TO BE COMPLETED BY THE HAULER/TRANSPORTER:

COMPANY NAME	ADDRESS	PHONE NO.
MORWITH TRUCKS	RT 329 NORTHAMPTON PA 18067	215 261-2220
VEHICLE I.D. NO. / STATE	COMMENTS	

I Hereby certify that the above described wastes were accepted for transportation at the producer's site and delivered to and off loaded at the waste facility. Both as listed hereupon. SIGNATURE (DRIVER) [signature] DATE

THIS SECTION TO BE COMPLETED BY RECEIVER AT DISPOSAL SITE:

COMPANY NAME	ADDRESS	PHONE NO.
BLUESTONE LANDFILL	716 CHAPEL ST SE WAYNESBURG PA	412-852-7476
RECEIVERS PERMIT NO.	COMMENTS	

I Hereby certify that the above described wastes were delivered to this Facility, that the Facility is authorized and permitted to receive such wastes.

AUTHORIZED SIGNATURE	CELL NO.	DATE

GENERATOR: Copies 1 & 6 AMERICAN WASTE SERVICES, INC.: Copies 2 & 3 RECEIVER: Copy 4 HAULER: Copy 5

GENERATOR - COPY 1

SEE LANDFILL RULES AND REGULATIONS ON BACK

876970248

WEST HUDSON

836 HARRISON AVE.

KEARNY, N. J. 07032 TEL. [illegible]-1216

Date 12/11/89 Weight $2610 LL2

Name

Name of Truck HOWARD

Tractor Lic. No. 202

Trailer Lic. No. 170

Truck Lic. No.

CLEAR ☑ PAID Box ROUND TRIP

RAIN ☐

SNOW ☐ CHARGE

Weighmaster [signature]

59757

Weight obtained by, using THE HOWE PATENTED RECORDING BEAM No.

From To

43 140 Gross Load of 202

39 700 Tare Driver { ON OFF 170

2610 Net Fees Date 19

Printed in U.S.A. Weigher

876970249

AMERICAN WASTE SERVICES, INC.

C/O LIBERTY CENTRE - SUITE 7
3530 BELMONT AVE., YOUNGSTOWN, OHIO 44505 PHONE (216) 759-7476

NON-HAZARDOUS WASTE MANIFEST DOCUMENT NO. 74843

THIS SECTION TO BE COMPLETED BY GENERATOR:

COMPANY NAME	ADDRESS	PICK-UP DATE
Guyon General Piping, Inc.	900 S. 4th St.	12.11.85
	Harrison NJ 07029 (CITY / STATE / ZIP)	WASTE NO. 2534-3

NAME OR DESCRIPTION OF WASTE SHIPPED: Sand Blasting Grit — P.O. NO.:

COMMENTS

GENERATOR ➡ OR AGENT ➡ MUST FILL ➡ IN QUANTITY ➡

QUANTITY SHIPPED: ONE LOAD

IN CASE OF AN EMERGENCY OR SPILL CONTACT	NAME	PHONE NO.	24-HR. EMERGENCY NO.

I Hereby certify that the above named material(s) are properly classified, described, packaged, marked, and labeled and are in proper condition for transportation according to the applicable regulations of the DOT and the EPA. — SIGNATURE: Rhoda Tuhalske — DATE: 12/11/85

THIS SECTION TO BE COMPLETED BY THE HAULER/TRANSPORTER:

COMPANY NAME	ADDRESS	PHONE NO.
HORWITH TRUCKS	RT 329 NORTHAMPTON PA 18067	215 261 [illegible]

VEHICLE I.D. NO.	STATE	COMMENTS

I Hereby certify that the above described wastes were accepted for transportation at the producer's site and delivered to and off loaded at the waste facility. Both as listed hereupon. — SIGNATURE (DRIVER): Edward Rose — DATE: 12-11-85

THIS SECTION TO BE COMPLETED BY RECEIVER AT DISPOSAL SITE:

COMPANY NAME	ADDRESS	PHONE NO.
BRISTINE LANDFILL	7916 CHADD ST S.E. NAVARRE OH	216 854-7411

RECEIVER'S PERMIT NO.	COMMENTS

I Hereby certify that the above described wastes were delivered to this Facility, that the Facility is authorized and permitted to receive such wastes. — AUTHORIZED SIGNATURE — CELL NO. — DATE

GENERATOR: Copies 1 & 6 — AMERICAN WASTE SERVICES, INC.: Copies 2 & 3 — RECEIVER: Copy 4 — HAULER: Copy 5

GENERATOR - COPY 1

SEE LANDFILL RULES AND REGULATIONS ON BACK

876970250

WEST HUDSON

836 HARRISON AVE.

KEARNY, N. J. 07032 TEL. [illegible]-1216

Date 12/1/89 Weight 80830

Name

Name of Truck Harwith

Tractor Lic. No. 206

Trailer Lic. No. 1455

Truck Lic. No.

CLEAR ☑

RAIN ☐

SNOW ☐

PAID 400 ROUND TRIP

CHARGE

Weighmaster

59742

Weights obtained by using THE HOWE PATENTED RECORDING BEAM No.

From

To

Load of

Gross 80830

Tare 40710

Net 40120

Driver ON OFF

Fees

Date 19

Weighmaster

Printed in U.S.A.

876970251

AMERICAN WASTE SERVICES, INC.

C/O LIBERTY CENTRE - SUITE 7
3530 BELMONT AVE., YOUNGSTOWN, OHIO 44505 PHONE (216) 759-7476

NON-HAZARDOUS WASTE MANIFEST DOCUMENT NO. 74844

THIS SECTION TO BE COMPLETED BY GENERATOR:

COMPANY NAME	ADDRESS	PICK-UP DATE
Guyon General Piping, Inc.	900 S. 4th St.	12.11.87
	Harrison NJ 07029 (CITY / STATE / ZIP)	WASTE NO. 2534-3

NAME OR DESCRIPTION OF WASTE SHIPPED: Sand Blasting Grit — P.O. NO.:

COMMENTS

GENERATOR ➡ OR AGENT ➡ MUST FILL ➡ IN QUANTITY ➡

QUANTITY SHIPPED: ONE LOAD

IN CASE OF AN EMERGENCY OR SPILL, CONTACT	NAME	PHONE NO.	24-HR. EMERGENCY NO.

I Hereby certify that the above named material(s) are properly classified, described, packaged, marked, and labeled and are in proper condition for transportation according to the applicable regulations of the DOT and the EPA. — SIGNATURE: Hooker Turbeville — DATE: 12/11/87

THIS SECTION TO BE COMPLETED BY THE HAULER/TRANSPORTER:

COMPANY NAME	ADDRESS	PHONE NO
HOEWITH TRUCKS	RT 329 NORTHAMPTON PA 18067	215 261 2227

VEHICLE I.D. NO. / STATE / COMMENTS

I Hereby certify that the above described wastes were accepted for transportation at the producer's site and delivered to and off loaded at the waste facility both as listed hereupon. — SIGNATURE (DRIVER): Willard Wertzbaugh — DATE:

THIS SECTION TO BE COMPLETED BY RECEIVER AT DISPOSAL SITE:

COMPANY NAME	ADDRESS	PHONE NO
BUTLER STONE LANDFILL	7716 CHAPEL ST S.E. WAYNESBURG, OH	216 735-7476

RECEIVER'S PERMIT NO. / COMMENTS

I Hereby certify that the above described wastes were delivered to this Facility, that the Facility is authorized and permitted to receive such wastes. — AUTHORIZED SIGNATURE / CELL NO. / DATE

GENERATOR: Copies 1 & 6 — AMERICAN WASTE SERVICES, INC: Copies 2 & 3 — RECEIVER: Copy 4 — HAULER: Copy 5

GENERATOR - COPY 1

SEE LANDFILL RULES AND REGULATIONS ON BACK

876970252

WEST HUDSON

936 HARRISON AVE.

KEARNY, N. J. 07032 TEL. [illegible]-1216

Date 12/11/89 Weight 81,680

Name

Name of Truck C/F/K with

Tractor Lic. No. # 1165

Trailer Lic. No. # 2114

Truck Lic. No.

CLEAR ☑ PAID 4W ROUND TRIP

RAIN ☐

SNOW ☐ CHARGE

Weighmaster

59741

Weight obtained by using THE NOWE PATENTED RECORDING BEAM No.

From To

Gross 36,160 Load of

Tare 25,520 Driver ON OFF

Net 10,640

Printed in U.S.A.

Date 19

Weighmaster

876970253

AMERICAN WASTE SERVICES, INC.

C/O LIBERTY CENTRE - SUITE 7 (
3530 BELMONT AVE., YOUNGSTOWN, OHIO 44505 PHONE (216) 759-7476

NON-HAZARDOUS WASTE MANIFEST DOCUMENT NO. 7484

THIS SECTION TO BE COMPLETED BY GENERATOR:

COMPANY NAME	ADDRESS	PICK-UP DATE
Guyon General Piping, Inc.	900 S. 4th St.	12-11-89
	Harrison NJ 07029 (CITY STATE ZIP)	WASTE NO. 2534-3

NAME OR DESCRIPTION OF WASTE SHIPPED: Sand Blasting Grit — P.O. NO.:

COMMENTS

GENERATOR ➡ OR AGENT ➡ MUST FILL ➡ IN QUANTITY ➡

QUANTITY SHIPPED: ONE LOAD

IN CASE OF AN EMERGENCY OR SPILL, CONTACT	NAME	PHONE NO.	24-HR. EMERGENCY NO.

I Hereby certify that the above named material(s) are properly classified, described, packaged, marked, and labeled and are in proper condition for transportation according to the applicable regulations of the DOT and the EPA. SIGNATURE: Thodore Turbulski DATE:

THIS SECTION TO BE COMPLETED BY THE HAULER/TRANSPORTER:

COMPANY NAME	ADDRESS	PHONE NO.
MORWITH TRUCKS	RT 329 NORTHAMPTON PA 18067	215-261-7335

VEHICLE I.D. NO.	STATE	COMMENTS

I Hereby certify that the above described wastes were accepted for transportation at the producer's site and delivered to and off loaded at the waste facility. Both as listed hereupon. SIGNATURE (DRIVER): Richard Wetherbee DATE: 12/11/89

THIS SECTION TO BE COMPLETED BY RECEIVER AT DISPOSAL SITE:

COMPANY NAME	ADDRESS	PHONE NO.
BRINSTONE LANDFILL	7116 CHAPEL ST S.E. WAYNESBURG, OH	216-857-7[illegible]

RECEIVER'S PERMIT NO.	COMMENTS

I Hereby certify that the above described wastes were delivered to this Facility, that the Facility is authorized and permitted to receive such wastes. AUTHORIZED SIGNATURE | CELL NO. | DATE

GENERATOR: Copies 1 & 6 — AMERICAN WASTE SERVICES, INC.: Copies 2 & 3 — RECEIVER: Copy 4 — HAULER: Copy 5

GENERATOR - COPY 1

SEE LANDFILL RULES AND REGULATIONS ON BACK

876970254

UNIFORM HAZARDOUS WASTE MANIFEST

1. Generator's US EPA ID No.: NJD002524015 | Manifest Document No.: 18741 | 2. Page 1 of 1 | Information in the shaded areas is not required by Federal law.

3. Generator's Name and Mailing Address
GUYON PIPE
900 FRANK E. RODGERS BLVD, HARRISON, NJ 07029
4. Generator's Phone (201) 485-5600

A. State Manifest Document Number: NNT-0918741
B. State Generator's ID: NJD 002 524 015

5. Transporter 1 Company Name: M + M CHEMICAL CO.
6. US EPA ID Number: ALD070513767
C. State Transporter's ID: ALD070513767
D. Transporter's Phone: 205/538-3800

7. Transporter 2 Company Name
8. US EPA ID Number
E. State Transporter's ID
F. Transporter's Phone

9. Designated Facility Name and Site Address
M & M Chemical & Equipment Co., Inc.
Hwy. 11 North (Mailing: Rt. 3, Box 285B)
Reece City, AL, Attalla, AL 35954
10. US EPA ID Number: ALD070513767
G. State Facility's ID: ALD070513767
H. Facility's Phone: 205/538-3800

	11. US DOT Description (including Proper Shipping Name, Hazard Class, and ID Number)	12. Containers No.	Type	13. Total Quantity	14. Unit Wt/Vol	I. Waste No.
GENERATOR a.	NA 1270 WASTE OIL, N.O.S. COMBUSTIBLE LIQUID	026	DM	0.1.4.3.0	G	NJX-726
b.	WASTE FLAMMABLE LIQUID, N.O.S., UN 1993	027	DM	0.1.4.8.5	G	D001
c.	WASTE CHEMICAL PROCESS LIQUID, NON-REGULATED	005	DM	0.0.2.7.5	G	NJX-900
d.						

J. Additional Descriptions for Materials Listed Above
a) LUBRICATING OIL 25-50, TRANSMISSION OIL 25-50, CUTTING OIL 25-50, MOTOR OIL 5-10, GLYCOLS 5-10, WATER 0-5
b) PAINT 5-75, MEK + OTHER PAINT SOLVENTS 25-95, PAINT SOLIDS 0-50
c) WATER 95-99, PAINT THINNERS 0-0.5, CUTTING OILS 0-0.5, DETERGENTS 0-1.0, RUST 0-0.5

K. Handling Codes for Wastes Listed Above

15. Special Handling Instructions and Additional Information
a) M+M CHEM. CO. WPS # AS DESCRIBED. 26 X 17 H
b) M+M CHEM. CO. WPS. AS DESCRIBED. 27 X 17 H
c) M+M CHEM. CO. WPS AS DESCRIBED. 5 X 17 H

16. GENERATOR'S CERTIFICATION: I hereby declare that the contents of this consignment are fully and accurately described above by proper shipping name and are classified, packed, marked, and labeled, and are in all respects in proper condition for transport by highway according to applicable international and national governmental regulations.

If I am a large quantity generator, I certify that I have a program in place to reduce the volume and toxicity of waste generated to the degree I have determined to be economically practicable and that I have selected the practicable method of treatment, storage, or disposal currently available to me which minimizes the present and future threat to human health and the environment; OR, if I am a small quantity generator, I have made a good faith effort to minimize my waste generation and select the best waste management method that is available to me and that I can afford.

Printed/Typed Name: Theodore Pichalski | Signature | Month 11 | Day 18 | Year

TRANSPORTER

17. Transporter 1 Acknowledgement of Receipt of Materials
Printed/Typed Name: T. MIKE PENNEY | Signature | Month 11 | Day 18 | Year 99

18. Transporter 2 Acknowledgement of Receipt of Materials
Printed/Typed Name | Signature | Month | Day | Year

FACILITY

19. Discrepancy Indication Space: Item 4 not completed

20. Facility Owner or Operator: Certification of receipt of hazardous materials covered by this manifest except as noted in item 19.

Printed/Typed Name: Vicki Leeth | Signature | Month 11 | Day 23 | Year 99

ORIGINAL — RETURN TO GENERATOR

876970255

State of New Jersey
Department of Environmental Protection
Division of Hazardous Waste Management
Manifest Section
CN 028, Trenton, NJ 08625

Please type or print in block letters. (Form designed for use on elite (12-pitch) typewriter.)

Form Approved. OMB No. 2050-0039 Expires 9-

UNIFORM HAZARDOUS WASTE MANIFEST

1. Generator's US EPA ID No. | Manifest Document No.

2. Page 1 of 1 | Information in the shaded ar is not required by Fede law

3. Generator's Name and Mailing Address
Guyon Paint
[illegible] Street
4. Generator's Phone (NJ) 2[illegible]7697

A. State Manifest Document Number: NJA 0751985

B. State Generator's ID: Same

5. Transporter 1 Company Name: S & W WASTE, INC.
6. US EPA ID Number: NJD[illegible]

C. State Trans. ID: NJSWA [illegible]

7. Transporter 2 Company Name
8. US EPA ID Number

D. Transporter's Phone ( )

E. State Trans. ID

9. Designated Facility Name and Site Address: S & W WASTE, INC
103 Jacobus Avenue
South Kearny NJ 07032
10. US EPA ID Number: NJD[illegible]

F. Transporter's Phone ( )

G. State Facility's ID

H. Facility's Phone (201) 344-4[illegible]

	11. US DOT Description (Including Proper Shipping Name, Hazard Class, and ID Number) HM		12. Containers No	Type	13. Total Quantity	14. Unit Wt/Vol	I. Waste No
GENERATOR	a.	X	WASTE FLAMMABLE LIQUID, N.O.S. Flammable Liquid, UN 1993, RQ (Benzene), 3, II	[illegible]	02		[illegible]
	b.	X	HAZARDOUS WASTE SOLID, N.O.S. ORM-E NA 9189	[illegible]	[illegible]	G	[illegible]
	c.						
	d.						

J. Additional Descriptions for Materials Listed Above
a. [illegible] Talc 1-5%
Alkyd Resins 10-20% Silicates 10-15%
T/S Speedy-Dry 951
Used machine oil 5%
c.
d.

K. Handling Codes for Wastes Listed Above
a.
c.
b.
d.

15. Special Handling Instructions and Additional Information
S & W APPROVAL NO. [illegible]

16. GENERATOR'S CERTIFICATION: I hereby declare that the contents of this consignment are fully and accurately described above by proper shipping name and are classified, packed, marked, and labeled, and are in all respects in proper condition for transport by highway according to applicable international and national government regulations.
If I am a large quantity generator, I certify that I have a program in place to reduce the volume and toxicity of waste generated to the degree I have determined to be economically practicable and that I have selected the practicable method of treatment, storage, or disposal currently available to me which minimizes the present and future threat to human health and the environment; OR, if I am a small quantity generator, I have made a good faith effort to minimize my waste generation and select the best waste management method that is available to me and that I can afford.

Printed/Typed Name | Signature | Month Day Year

TRANSPORTER

17. Transporter 1 Acknowledgement of Receipt of Materials
Printed/Typed Name | Signature | Month Day Year

18. Transporter 2 Acknowledgement of Receipt of Materials
Printed/Typed Name | Signature | Month Day Year

FACILITY

19. Discrepancy Indication Space

20. Facility Owner or Operator: Certification of receipt of hazardous materials covered by this manifest except as noted in Item 19
Printed/Typed Name | Signature | Month Day Year

EPA Form 8700-22 (Rev. 9/88) Previous editions are obsolete

8 — GENERATOR COPY

SIGNATURE AND INFORMATION MUST BE LEGIBLE ON ALL COPIES

876970256

NOTIFICATION FOR WASTES RESTRICTED FROM LAND DISPOSAL

MATERIAL TYPE: ☐ SPENT SOLVENT ☑ CALIFORNIA LIST WASTE

GENERATOR'S NAME: Dwyer Piping SITE ADDRESS: 900 S. 4th St. Harrison, NJ 07029

GEN. EPA ID. NUMBER: NJD002548415

MANIFEST NO.: NJA0250986 Line No. ☑ 11a ☐ 11b ☐ 11c ☐ 11d

APPROVAL #: 002 HAZARDOUS WASTE NUMBER(S): D008 D007

I am supplying this notice and certification to: Ecology & Environment in accordance with the requirements of regulations at 40 CFR 268.7. I have determined that the material described above either contains spent solvents or is a "California list" waste as defined in 40 CFR 268. I have indicated above the type of material which is covered by this notification. I have also indicated below the appropriate management required to comply with the prohibitions on land disposal for this material.

RESTRICTED WASTE REQUIRING TREATMENT

I. ☑ I am the generator of an untreated waste restricted from land disposal under 40 CFR 268. This waste, identified above, may not be land disposed unless it is first treated to the appropriate treatment standard(s) as indicated below. I have attached available waste analysis data ☐ YES ☑ NO

RESTRICTED WASTES NOT REQUIRING FURTHER TREATMENT.

II. ☐ The waste identified above has been treated in compliance with the applicable treatment standards specified in 40 CFR 268 Subpart D and/or the applicable prohibitions set forth in 40 CFR 268.32. I have indicated the appropriate treatment standards or applicable prohibitions below.

"I Certify under penalty of law that I personally have examined and am familiar with the waste through analysis and testing or through knowledge of the waste to support this certification that the waste complies with the treatment standards specified in 40 CFR Part 268 Subpart D and all applicable prohibitions set forth in 40 CFR 268.32 or RCRA section 3004(d). I believe that the information I submitted is true, accurate and complete. I am aware that there are significant penalties for submitting a false certification, including the possibility of a fine and imprisonment."

SIGNATURE _____ TITLE _____ DATE _____

I have attached available waste analysis data ☐ YES ☐ NO

RESTRICTED WASTE SUBJECT TO EXTENSION, PETITION, OR VARIANCE

III. ☐ The waste material identified above is subject to a case-by-case extension under 268.5, a petition under 268.6, or a nationwide variance under Part 268 Subpart C.

The following materials are contained in the waste and either require treatment to the specified levels or have been treated to the specified level depending on whether Box I or Box II was checked above.

SPENT SOLVENTS

Material	Treatment Standard (Mg/l) Wastewater	Other
___ Acetone	0.05	0.59
___ n-Butyl Alcohol	5.0	5.0
___ Carbon Disulfide	1.05	4.81
___ Carbon Tetrachloride	.05	.56
___ Chlorobenzene	.15	.05
___ Cresols (and cresylic acid)	2.82	.75
___ Cyclohexanone	.125	.75
___ 1,2 dichlorobenzene	.55	.125
___ Ethyl Acetate	.05	.75
___ Ethyl Benzene	.05	.053
___ Ethyl Ether	.05	.75
___ Isobutanol	5.0	5.0
___ Methanol	.75	.75
___ Methylene Chloride	.20	.96
___ Methylene Chloride (Pharmaceutical industry)	12.7	.96
___ Methyl ethyl ketone	.05	.75
___ Methyl isobutyl ketone	.05	.33
___ Nitrobenzene	.66	.125
___ Pyridine	1.12	.33
___ Tetrachloroethylene	.079	.05
___ Toluene	1.12	.33
___ 1,1,1-Trichloroethane	1.05	.41
___ 1,2,3-Trichloropropane	1.05	.96
___ Trichloroethylene	.062	.091
___ Trichlorofluoromethane	.05	.96
___ Xylene	.05	.15

"CALIFORNIA LIST" PROHIBITIONS

___ Liquid hazardous waste that contains PCBs in total concentrations greater than or equal to 1,000 mg/l but are not incinerated.

___ Non-liquid hazardous waste containing PCBs in total concentrations greater than or equal to 1,000 mg/kg.

___ Liquid Hazardous Waste having a pH less than or equal to 2.

___ Liquid Hazardous Waste containing PCB's at a concentration greater than or equal to 50 ppm.

___ Liquid Hazardous Waste that is primarily water and contains halogenated organic compounds (HOC's) in total concentration greater than or equal to 1,000 ppm and less than 10,000 ppm.

___ Liquid Hazardous Waste, including free liquids associated with any solid or sludge, containing the following metals or compounds at these metals at concentrations at greater than or equal to these specified below:

___ Arsenic (As) 500 ppm	___ Mercury (Hg) 20 ppm
___ Cadmium (Cd) 100 ppm	___ Nickel (Ni) 134 ppm
___ Chromium (Cr+) 500 ppm	___ Selenium (Se) 100 ppm
___ Lead (Pb) 500 ppm	___ Thallium (Tl) 130 ppm

___ Liquid Hazardous Waste, including free liquids associated with any solid or sludge, containing free Cyanides at concentrations greater than or equal to 1,000 ppm.

I hereby certify that all information supplied above, and attached is complete and accurate to the best of my knowledge and ability to determine that no emissions of ozone exist.

NAME: James D. Dowlin TITLE: Exec. V.P.

SIGNATURE: _____ DATE: 11/4/85

876970257

State of New Jersey
Department of Environmental Protection
Division of Hazardous Waste Management
Manifest Section
CN 028, Trenton, NJ 08625

Please type or print in block letters. (Form designed for use on elite (12-pitch) typewriter.)

Form Approved OMB No. 2050-0039 Expires 9-30-91

UNIFORM HAZARDOUS WASTE MANIFEST

1. Generator's US EPA ID No. | Manifest Document No. | 2. Page 1 of 1 | Information in the shaded areas is not required by Federal law.

3. Generator's Name and Mailing Address
Cyanamid
[illegible] Street
Morristown
4. Generator's Phone ( ) [illegible]-7677

A. State Manifest Document Number: NJA 0750974
B. State Generator's ID:
C. State Trans. ID: NJ[illegible]
D. Transporter's Phone: (201) 344-60[illegible]
E. State Trans. ID:
F. Transporter's Phone ( )
G. State Facility's ID:
H. Facility's Phone: (201) 344-6[illegible]

5. Transporter 1 Company Name: S & W WASTE INC. | 6. US EPA ID Number: N J D 0 5 2 1 2 5 3 1 0 5
7. Transporter 2 Company Name: | 8. US EPA ID Number:
9. Designated Facility Name and Site Address: S & W WASTE, INC. 105 Jacobus Avenue South Kearny, NJ 0703[illegible] | 10. US EPA ID Number: N J D 0 5 2 1 2 5 3 1 0 5

11. US DOT Description (Including Proper Shipping Name, Hazard Class, and ID Number) HM	12. Containers No	Type	13. Total Quantity	14. Unit Wt./Vol.	I. Waste No.
a. Non-Regulated Material XYZ	XX	[illegible]	[illegible]	Y	[illegible]
b.					
c.					
d.					

J. Additional Descriptions for Materials Listed Above
S/
a. c.
b. d.

K. Handling Codes for Wastes Listed Above
a. c.
b. d.

15. Special Handling Instructions and Additional Information
S & W APPROVAL NO: C[illegible]

16. GENERATOR'S CERTIFICATION: I hereby declare that the contents of this consignment are fully and accurately described above by proper shipping name and are classified, packed, marked, and labeled, and are in all respects in proper condition for transport by highway according to applicable international and national government regulations.
If I am a large quantity generator, I certify that I have a program in place to reduce the volume and toxicity of waste generated to the degree I have determined to be economically practicable and that I have selected the practicable method of treatment, storage, or disposal currently available to me which minimizes the present and future threat to human health and the environment; OR, if I am a small quantity generator, I have made a good faith effort to minimize my waste generation and select the best waste management method that is available to me and that I can afford.

Printed/Typed Name | Signature | Month Day Year

17. Transporter 1 Acknowledgement of Receipt of Materials
Printed/Typed Name | Signature | Month Day Year

18. Transporter 2 Acknowledgement of Receipt of Materials
Printed/Typed Name | Signature | Month Day Year

19. Discrepancy Indication Space

20. Facility Owner or Operator Certification of receipt of hazardous materials covered by this manifest except as noted in Item 19
Printed/Typed Name | Signature | Month Day Year

NJA

EPA Form 8700-22 (Rev. 9/88) Previous editions are obsolete.

8 — GENERATOR COPY

SIGNATURE AND INFORMATION MUST BE LEGIBLE ON ALL COPIES

876970258

Please print or type (Form designed for use on elite (12-pitch) typewriter)

Form Approved. OMB No. 2050-0039 Expires 9-30-8

UNIFORM HAZARDOUS WASTE MANIFEST (Continuation Sheet)	21. Generator's US EPA ID No. PAD082524815	Manifest Document No. 52180	22. Page 2	Information in the shaded areas is not required by Federal law.

23. Generator's Name: Guyon Piping, 900 Frankrogers Blvd., Harrison,) 07029, 215-499-7477

L. State Manifest Document Number:

M. State Generator's ID:

24. Transporter ___ Company Name: S & W WASTE, INC. | 25. US EPA ID Number: PAD991251105

N. State Transporter's ID:

O. Transporter's Phone:

26. Transporter ___ Company Name | 27. US EPA ID Number

P. State Transporter's ID:

Q. Transporter's Phone:

	28. US DOT Description (Including Proper Shipping Name, Hazard Class, and ID Number)	HM	29. Containers No.	Type	30. Total Quantity	31. Unit Wt/Vol	R. Waste No.
a.	HAZARDOUS WASTE LIQUID, NOS 6804-E NA 9189	X	3	DM	165	G	X726
b.	Non Regulated Material X910		3	DM	2700	P	X910
c.	Non Regulated Material X900		4	DF	220	G	X900
d.							
e.							
f.							
g.							
h.							
i.							

GENERATOR

8. Additional Descriptions for Materials Listed Above: a) T/A Roofing Tar 60-70% c) L/ Residue Grease 10-20% Soils Water 0-10% b) SV

T. Handling Codes for Wastes Listed Above:

32. Special Handling Instructions and Additional Information: 000236 a) 805 b) 806 c) 807

Trailer Haul Tickets to be returned as Attachment

TRANSPORTER

33. Transporter ___ Acknowledgement of Receipt of Materials — Printed/Typed Name | Signature | Date (Month Day Year)

34. Transporter ___ Acknowledgement of Receipt of Materials — Printed/Typed Name: [illegible] | Signature | Date (Month Day Year)

35. Discrepancy Indication Space

FACILITY

Style F16 REV-6 LABELMASTER, Div. of AMERICAN LABELMARK CO., CHICAGO, IL 60646

EPA Form 8700-22A (Rev. 9-88) Previous editions are obsolete

876970259

State of New Jersey
Department of Environmental Protection
Division of Hazardous Waste Management
Manifest Section
CN 028, Trenton, NJ 08625

Please type or print in block letters. (Form designed for use on elite (12-pitch) typewriter.)

Form Approved. OMB No. 2050-0039 Expires 9-30-91

UNIFORM HAZARDOUS WASTE MANIFEST

1. Generator's US EPA ID No. | Manifest Document No. | 2. Page 1 of 1 | Information in the shaded areas is not required by Federal law.

3. Generator's Name and Mailing Address
Wayne Plastics
[illegible] Frederick's Blvd
[illegible]

A. State Manifest Document Number: NJA 0752180

4. Generator's Phone ( )

B. State Generator's ID: 3888

5. Transporter 1 Company Name | 6. US EPA ID Number
S & W WASTE, INC. | NJD991291105

C. State Trans. ID [illegible] 300

7. Transporter 2 Company Name | 8. US EPA ID Number

D. Transporter's Phone (201) 344-4[illegible]

E. State Trans. ID

9. Designated Facility Name and Site Address | 10. US EPA ID Number
S & W WASTE, INC.
[illegible] Jacobus Avenue
South Kearny, NJ 07032 | NJD991291105

F. Transporter's Phone ( )

G. State Facility's ID

H. Facility's Phone (201) 344-4300

11. US DOT Description (Including Proper Shipping Name, Hazard Class, and ID Number) HM		12. Containers No.	Type	13. Total Quantity	14. Unit Wt/Vol	I. Waste No
a.		Non Regulated Material X799				X799
b.	X	[illegible] Flammable Liquid, UN 1993				D009
c.	X	HAZARDOUS WASTE SOLID, N.O.S. ORM-E NA 9189				X726
d.	X	HAZARDOUS WASTE SOLID, N.O.S. ORM-E NA 9189				C153

J. Additional Descriptions for Materials Listed Above
a. [illegible]
c. Y/S Speedy Dry 85%
Machine Oil 5%
Used Roofing Tar 30%
e. I.A. Also D001/D007, RCX 10-20% Y/S Speedy Dry 80-90%
RCX 20-30%, RCA 2-5%, Talc 1-5% Paint 0-10%

K. Handling Codes for Wastes Listed Above
a.
c.
b.
d.

15. Special Handling Instructions and Additional Information
Alkyd Resin 10-[illegible]
[illegible]

16. GENERATOR'S CERTIFICATION: I hereby declare that the contents of this consignment are fully and accurately described above by proper shipping name and are classified, packed, marked, and labeled, and are in all respects in proper condition for transport by highway according to applicable international and national government regulations.

If I am a large quantity generator, I certify that I have a program in place to reduce the volume and toxicity of waste generated to the degree I have determined to be economically practicable and that I have selected the practicable method of treatment, storage, or disposal currently available to me which minimizes the present and future threat to human health and the environment; OR, if I am a small quantity generator, I have made a good faith effort to minimize my waste generation and select the best waste management method that is available to me and that I can afford.

Printed/Typed Name	Signature	Month	Day	Year
[illegible]	[illegible]			

17. Transporter 1 Acknowledgement of Receipt of Materials

Printed/Typed Name	Signature	Month	Day	Year
[illegible]	[illegible]			

18. Transporter 2 Acknowledgement of Receipt of Materials

Printed/Typed Name	Signature	Month	Day	Year

19. Discrepancy Indication Space

20. Facility Owner or Operator: Certification of receipt of hazardous materials covered by this manifest except as noted in item 19

Printed/Typed Name	Signature	Month	Day	Year

EPA Form 8700-22 (Rev. 9-88) Previous editions are obsolete.

8 — GENERATOR COPY

SIGNATURE AND INFORMATION MUST BE LEGIBLE ON ALL COPIES

876970260

State of New Jersey
Department of Environmental Protection
Division of Hazardous Waste Management
Manifest Section
CN 028, Trenton, NJ 08625

Please type or print in black letters. (Form designed for use on elite (12-pitch) typewriter.)

Form Approved. OMB No. 2050-0039. Expires 9-30-

UNIFORM HAZARDOUS WASTE MANIFEST

1. Generator's US EPA ID No. | Manifest Document No. | 2. Page 1 of 1 | Information in the shaded area is not required by Federal law.

3. Generator's Name and Mailing Address
[illegible] General Mill
9[illegible] Frank Rogers Blvd.
Harrison, NJ 0[illegible]
4. Generator's Phone ( )

A. State Manifest Document Number: NJA 0752139
B. State Generator's ID: Same
C. [illegible]
D. Transporter's Phone ( )
E. State Trans. ID
F. Transporter's Phone ( )
G. State Facility's ID
H. Facility's Phone (609) 344-[illegible]

5. Transporter 1 Company Name: S & W WASTE, INC. | 6. US EPA ID Number: NJD991291305
7. Transporter 2 Company Name | 8. US EPA ID Number
9. Designated Facility Name and Site Address: S & W WASTE, INC. 105 Jacobus Avenue South Kearny, NJ 07032 | 10. US EPA ID Number: NJD991291305

11. US DOT Description (Including Proper Shipping Name, Hazard Class, and ID Number) HM	12. Containers No.	Type	13. Total Quantity	14. Unit Wt/Vol	I. Waste
a. Non Regulated Material X75	X11	[illegible]	[illegible]	-	[illegible]
b.					
c.					
d.					

J. Additional Descriptions for Materials Listed Above
K. Handling Codes for Wastes Listed Above
a. [illegible] METAL [illegible]
b. [illegible] EPOXIDE
c. [illegible] EPOXIDE CAN-THAT
d. [illegible] PAINT BOOTH CLEANER
e. [illegible] OR CONTENTS
a. | c.
b. | d.

15. Special Handling Instructions and Additional Information
S & W APPROVAL NO. [illegible]

16. GENERATOR'S CERTIFICATION: I hereby declare that the contents of this consignment are fully and accurately described above by proper shipping name and are classified, packed, marked, and labeled, and are in all respects in proper condition for transport by highway according to applicable international and national government regulations.
If I am a large quantity generator, I certify that I have a program in place to reduce the volume and toxicity of waste generated to the degree I have determined to be economically practicable and that I have selected the practicable method of treatment, storage, or disposal currently available to me which minimizes the present and future threat to human health and the environment; OR, if I am a small quantity generator, I have made a good faith effort to minimize my waste generation and select the best waste management method that is available to me and that I can afford.

Printed/Typed Name: Pickutski | Signature: [illegible] | Month Day Year

17. Transporter 1 Acknowledgement of Receipt of Materials
Printed/Typed Name: JEROME MAILLARO | Signature | Month Day Year

18. Transporter 2 Acknowledgement of Receipt of Materials
Printed/Typed Name | Signature | Month Day Year

19. Discrepancy Indication Space

20. Facility Owner or Operator: Certification of receipt of hazardous materials covered by this manifest except as noted in Item 19.
Printed/Typed Name | Signature | Month Day Year

EPA Form 8700-22 (Rev. 9/88) Previous editions are obsolete.

8 — GENERATOR COPY

SIGNATURE AND INFORMATION MUST BE LEGIBLE ON ALL COPIES!

876970261

46-14-1 (3/89) — 71

STATE OF NEW YORK
DEPARTMENT OF ENVIRONMENTAL CONSERVATION
DIVISION OF HAZARDOUS SUBSTANCES REGULATION

HAZARDOUS WASTE MANIFEST

P.O. Box 12820, Albany, New York 12212

Please print or type. Do not Staple.

Form Approved. OMB No. 2050-0039. Expires 9-30-9

UNIFORM HAZARDOUS WASTE MANIFEST

1. Generator's US EPA No. / Manifest Document No.

2. Page 1 of 1 — Information in the shaded are is not required by Federal La

3. Generator's Name and Mailing Address

A. State Manifest Document No. NY B 1931274

4. Generator's Phone ( )

B. Generator's ID

5. Transporter 1 (Company Name) — 6. US EPA ID Number

C. State Transporter's ID

D. Transporter's Phone ( )

7. Transporter 2 (Company Name) — 8. US EPA ID Number

E. State Transporter's ID

F. Transporter's Phone ( )

9. Designated Facility Name and Site Address — 10. US EPA ID Number

G. State Facility's ID

H. Facility's Phone

11. US DOT Description (Including Proper Shipping Name, Hazard Class and ID Number)	12. Containers No.	Type	13. Total Quantity	14. Unit Wt./Vol.	I. Waste No.
a. WASTE FLAMMABLE LIQUID, N.O.S. FLAMMABLE LIQUID UN1993	003	DM	00550	P	EPA D001 STATE
b. WASTE COMBUSTIBLE LIQUID, N.O.S. COMBUSTIBLE LIQUID NA 1993	002	DM	00110	P	EPA D001 STATE
c. HAZARDOUS WASTE LIQUID, N.O.S. ORM-E NA 9189	001	DM	00110	P	EPA D001 STATE
d. HAZARDOUS WASTE SOLID, N.O.S. ORM-E NA 9189	00[illegible]	[illegible]	[illegible]	P	EPA D001 STATE D007

J. Additional Descriptions for Materials Listed Above

K. Handling Codes for Wastes Listed Above

a. [illegible] b. [illegible] c. [illegible] d. [illegible]

15. Special Handling Instructions and Additional Information CHROMIC ACID + PAINTS WITH LEAD

a. TECH NO. 582 c. TECH NO. 582

b. TECH NO. 582 d. TECH NO. 583(a); TECH NO. 585(1)

16. GENERATOR'S CERTIFICATION: I hereby declare that the contents of this consignment are fully and accurately described above by proper shipping name and are classified, packed, marked and labeled, and are in all respects in proper condition for transport by highway according to applicable international and national government regulations and state laws and regulations.

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Printed/Typed Name [illegible] Signature [illegible] Mo. Day Year [illegible]

TRANSPORTER

17. Transporter 1 (Acknowledgement of Receipt of Materials)

Printed/Typed Name [illegible] Signature [illegible] Mo. Day Year [illegible]

18. Transporter 2 (Acknowledgement of Receipt of Materials)

Printed/Typed Name Signature Mo. Day Year

FACILITY

19. Discrepancy Indication Space

20. Facility Owner or Operator: Certification of receipt of hazardous materials covered by this manifest except as noted in Item 19.

Printed/Typed Name Signature Mo. Day Year

In case of emergency or spill immediately call the National Response Center (800) 424-8802 and the N.Y. Dept. of Environmental Conservation (518) 457-7362.

EPA Form 8700-22 (Rev. 9-88) Previous editions are obsolete.

COPY 8—Generator—retained by generator

NY B1931274

876970262

46-14-1 (3/89)—71

STATE OF NEW YORK
DEPARTMENT OF ENVIRONMENTAL CONSERVATION
DIVISION OF HAZARDOUS SUBSTANCES REGULATION

HAZARDOUS WASTE MANIFEST

P.O. Box 12820, Albany, New York 12212

Please print or type. Do not Staple.

Form Approved. OMB No. 2050-0039. Expires 9-30-91

UNIFORM HAZARDOUS WASTE MANIFEST

1. Generator's US EPA No. / Manifest Document No.

2. Page 1 of 1

Information in the shaded areas is not required by Federal Law.

3. Generator's Name and Mailing Address

A. State Manifest Document No. NY B 193126 5

4. Generator's Phone ( )

B. Generator's ID

5. Transporter 1 (Company Name) 6. US EPA ID Number

C. State Transporter's ID

7. Transporter 2 (Company Name) 8. US EPA ID Number

D. Transporter's Phone

E. State Transporter's ID

9. Designated Facility Name and Site Address 10. US EPA ID Number

F. Transporter's Phone ( )

G. State Facility's ID

H. Facility's Phone

11. US DOT Description (Including Proper Shipping Name, Hazard Class and ID Number)	12. Containers No.	Type	13. Total Quantity	14. Unit Wt/Vol	I. Waste No.
a.					EPA / STATE
b.					EPA / STATE
c.					EPA / STATE
d.					EPA / STATE

J. Additional Descriptions for Materials listed Above

K. Handling Codes for Wastes Listed Above

a. c.

b. d.

15. Special Handling Instructions and Additional Information

TRANSPORTERS LIC PLATE #(DOT)XKS1XX

16. **GENERATOR'S CERTIFICATION:** I hereby declare that the contents of this consignment are fully and accurately described above by proper shipping name and are classified, packed, marked and labeled, and are in all respects in proper condition for transport by highway according to applicable international and national government regulations and state laws and regulations.

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Printed/Typed Name / Signature / Mo. Day Year

TRANSPORTER

17. Transporter 1 (Acknowledgement of Receipt of Materials)

Printed/Typed Name / Signature / Mo. Day Year

18. Transporter 2 (Acknowledgement of Receipt of Materials)

Printed/Typed Name / Signature / Mo. Day Year

FACILITY

19. Discrepancy Indication Space

20. Facility Owner or Operator: Certification of receipt of hazardous materials covered by this manifest except as noted in Item 19.

Printed/Typed Name / Signature / Mo. Day Year

EPA Form 8700-22 (Rev. 9-88) Previous editions are obsolete.

In case of emergency or spill immediately call the National Response Center (800) 424-8802 and the N.Y. Dept. of Environmental Conservation (518) 457-7362.

DESIGNATED FACILITY TO

NY B 193126-5

COPY 8—Generator—retained by generator

876970263

DNR
MICHIGAN DEPARTMENT OF NATURAL RESOURCES

DO NOT WRITE IN THIS SPACE
ATT. ☐ DIS. ☐ REJ. ☐ PR. ☐

Required under Section 3 of Act 1979 as amended and Act 136 of 1969

Failure to file is punishable under section 299.548 MCL or Section 3 Act 136 PA 1969

Please print or type

UNIFORM HAZARDOUS WASTE MANIFEST

Form Approved. OMB No. 2050-0039 Expires 9-

1. Generator's US EPA ID No. | Manifest Document No. | 2. Page 1 | Information in the shaded areas is not required by Federal law

MI 1657295

3. Generator's Name and Mailing Address
Guyon General Piping
960 Rogers Blvd. Harrison, New Jersey 07029

4. Generator's Phone (201) 485-5600

5. State Manifest Document Number

6. State Generator's ID

5. Generator 1 Company Name
John Pfrener, Inc.

6. US EPA ID Number

7. Transporter 2 Company Name

8. US EPA ID Number

9. Designated Facility Name and Site Address
Chem-Met Services, Inc.
[illegible] Allen Road
[illegible], Michigan 48192

10. US EPA ID Number

11. Transporter's Phone

12. State Transporter's ID

13. State Transporter's Phone

14. State Facility's ID

15. State Facility's Phone

16. US DOT Description (Including Proper Shipping Name, Hazard Class, and ID NUMBER)	HM	17. Containers No.	Type	Total Quantity	Unit Wt/Vol	I. Waste No.
a. Non Dot and Non RCRA regulated material (Approval # GUY 01502)					P	02 9
b. Non DOT and NON Rcra regulated material (Approval #01501 Guy)					P	02 9 1
c.						
d.						

J. Additional Descriptions for Materials Listed Above
Steel and Wheelabrite waste non-chromium regulated solid solid

K. Handling Codes for Wastes Listed Above
a/
b/
c/
d/

15. Special Handling Instructions and Additional Information

18. GENERATOR'S CERTIFICATION: I hereby declare that the contents of this consignment are fully and accurately described above by proper shipping name and are classified, packed, marked, and labeled, and are in all respects in proper condition for transport by highway according to applicable international and national government regulations.

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Printed/Typed Name | Signature | Date Month Day

17. Transporter 1 Acknowledgement of Receipt of Materials
Printed/Typed Name | Signature | Date Month Day

18. Transporter 2 Acknowledgement of Receipt of Materials
Printed/Typed Name | Signature | Date Month Day

19. Discrepancy Indication Space

20. Facility Owner or Operator: Certification of receipt of hazardous materials covered by this manifest except as noted in Item 19.
Printed/Typed Name | Signature | Month Day

EPA Form 8700-22 (Rev. 9/88)

GENERATOR 1st COPY

876970264

DWM-030
6/84

N.J. DEPT. OF ENVIRONMENTAL PROTECTION
DIVISION OF WASTE MANAGEMENT

WASTE ORIGIN – WASTE DISPOSAL FORM

TRANSPORTER'S REGISTERED NAME Bergen Technology Inc

TRANSPORTER'S DEP NUMBER 27883 VEHICLE PLATE NO. YT-45TH (N.J)

WASTE TYPE(S) (Please circle) 10 12 13 23 25 27 72 73 74 CU. YDS. 10 GALS. _____

WASTE ORIGIN: STATE: (Circle) NJ PA NY MD DE Other

MUNICIPALITY(IES)*	COUNTY(IES)	% INCREMENTAL LOAD
Guttenberg	Hudson	100%

TRANSPORTER'S CERTIFICATION: I hereby certify that the information provided on this form is true to the best of my knowledge.

Transporter's Signature

Date 3/14/90 Time 3 PM

OPERATOR'S VERIFICATION: I hereby verify that this form has been completed by the registered transporter identified above, and that the waste identified by the transporter is permitted to be disposed of at this facility.

Operator's Signature

FACILITY ID NO. _____

* If waste from transfer station, use Transfer Station Facility ID No.

876970265

A-1 GENERATOR NAME: Tru Green Pipe No. 1975

A-2 GENERATOR SERVICE ADDRESS: 900 Frank Rodgers Blvd P.O. #

Harrison, NJ.

A-3 GENERATOR CONTACT: M Kennedy TITLE:

A-4 PHONE NUMBER - AREA CODE: 201) 440. 1130

A-5 DATE SHIPPED FROM SERVICE LOCATION: 4 2. 90

A-6 GENERATOR SIGNATURE: M Kennedy TIME:

A-7 GENERATOR IDENTIFICATION OF WASTE: 6 mil. Double Bagged Asbestos R.Q. Hazardous Substance Solid N.O.S. or N-RNA 9188 Note: This material is not an EPA/RCRA Hazardous Waste

B-1 DRIVERS NAME: Wallace S.

B-2 DRIVERS SIGNATURE: Dan Wallace

B-3 CONTRACTOR: Bergen Technology

B-4 TRANSPORTER NAME: DelVecchio Transport For Newark Disposal Service, Inc.

B-5 TRANSPORTER ADDRESS: P.O. Box 480 495 South Street

Dunmore, Pa. 18512-0480 Newark, N.J.

B-6 TRANSPORTER CONTACT: Steve Pello TITLE: Dispatcher

B-7 PHONE NUMBER - AREA CODE: (717) 348-6880 FAX 717-348-6886

B-8 TRANSPORTER DELIVERY DATE: 4. 6. 90

B-9 DRIVERS NAME: Dukeskin TIME:

B-10 DRIVERS SIGNATURE: Chad D. Dunk

C-1 LANDFILL NAME: S & S Landfill

C-2 LANDFILL ADDRESS: Rt. 98, Clarksburg, West Virginia

C-3 LANDFILL REGISTRATION NUMBER: 64902

C-4 LOAD RECEIVED AS STATED BY GENERATOR: YES ——— NO ———

C-5 LOAD REJECTED BY INSPECTOR: YES ——— NO ———

C-6 DELIVERY RECEIVED DATE: 4. 6. 90

C-7 DELIVERY RECEIVED TIME: 7:45 AM

C-8 INSPECTORS SIGNATURE: Carla Riley

876970266

G

876970267

COLTEC INDUSTRIES, INC.

TAB G

July 26, 2000 New Jersey Department of the Treasury, Division of Revenue Status Report for Coltec Industries, Inc., formerly Colt Industries, Inc. and Crucible Materials Corporation.

New Jersey Department of the Treasury, Division of Revenue

Status Report For:

Business Name	Business ID Number	Transaction Number, Seq	Report Date
COLTEC INDUSTRIES INC.	0100311702	110985 : 1	7/26/2000

Business Type:	FOREIGN PROFIT CORPORATION
Status:	ACTIVE

Filing Date:	09/22/1986	**Home Jurisdiction:**	PA
Status Change Date (If dissolved, withdrawn or canceled):		**Stock Amount:**	0
DOR Suspension Start Date:		**DOR Suspension End Date:**	
Tax Suspension Start Date:		**Tax Suspension End Date:**	
Annual Report Month:	4	**Last Annual Report Filed:** **For Last AR Paid Year:**	05/01/2000 1999

Incorporator:	
Agent:	THE CORPORATION TRUST COMPANY
Agent Address:	820 BEAR TAVERN ROAD TRENTON, NJ 08628 0000
Office Address Status:	Deliverable

876970269

Main Business Address:	3 COLISEUM CTR W TYVOLA RD CHARLOTTE, NC 28217
Principal Business Address:	

Associated Names:

Name	Type Description
COLT INDUSTRIES INC.	PREVIOUS NAME

Next Status Report | Order Additional Business Information

Session Account Status | Transaction Detail Report

Home Page | Done

876970270

New Jersey Department of the Treasury, Division of Revenue

Status Report For:

Business Name	Business ID Number	Transaction Number, Seq	Report Date
CRUCIBLE MATERIALS CORPORATION	0100208991	113382 : 1	8/2/2000

Business Type:	FOREIGN PROFIT CORPORATION
Status:	ACTIVE

Filing Date:	10/21/1983	**Home Jurisdiction:**	DE
Status Change Date (If dissolved, withdrawn or canceled):		**Stock Amount:**	0
DOR Suspension Start Date:		**DOR Suspension End Date:**	
Tax Suspension Start Date:		**Tax Suspension End Date:**	
Annual Report Month:	4	**Last Annual Report Filed:** **For Last AR Paid Year:**	10/02/1998 1998

87697027 1

Incorporator:	
Agent:	THE CORPORATION TRUST COMPANY
Agent Address:	820 BEAR TAVERN ROAD TRENTON, NJ 08628 0000
Office Address Status:	Deliverable
Main Business Address:	575 STATE FAIR BLVD SYRACUSE, NY 13201
Principal Business Address:	585 NORTH MICHIGAN AVE KENILWORTH, NJ 07033

Associated Names:

Name	Type Description

Next Status Report | Order Additional Business Information

Session Account Status | Transaction Detail Report

Home Page | Done

87697077

Dun & Bradstreet

U.S. Company Reports

04-182-6843
11-850-8878
000729
CRUCIBLE MATERIALS CORP (DE)

IN DATE

DUNS: 11-850-8878	DATE PRINTED	SUMMARY	
CRUCIBLE MATERIALS CORP (DE)	AUG 07 2000	RATING	1R3
+CRUCIBLE SPECIALTY METALS DIVISION	MFG HIGH ALLOY &	STARTED	1985
+CRUCIBLE COMPACTION METAL DIVISION	CORROSION	SALES	$360,000,000
+TRENT TUBE DIVISION	RESISTANT METALS	EMPLOYS	1,900 (1,000 HERE)
+CRUCIBLE SERVICE CENTERS DIVISION	SIC NOS.	HISTORY	CLEAR
	33 12 32 64	FINANCING	SECURED

PO BOX 977
SYRACUSE NY 13201
575 STATE FAIR BLVD
AND BRANCH(ES) OR DIVISION(S)
SOLVAY NY 13209
TEL: 315 487-4111

CHIEF EXECUTIVE: JOHN L VENSEL, CHB-CEO

* * * CUSTOMER SERVICE * * *

If you need any additional information or have any questions, please call the D&B Online Customer Service Center at 1-800-223-1026.

* * * SUMMARY ANALYSIS * * *

The Summary Analysis section reflects information in D&B's file as of August 7, 2000.

RATING SUMMARY . . . .

The Rating was changed on September 17, 1999 because the company has not submitted a current financial statement. The "1R" portion of the Rating (the Rating Classification) indicates business size of 10 or more employees for this company. The "3" on the right (Composite Credit Appraisal) indicates an overall "fair" credit appraisal. This credit appraisal was assigned because the payment information in D&B's file on this company indicates slowness in meeting trade obligations and the presence of "Secured Financing" in D&B's file.

Below is an overview of the company's D&B Rating(s) since 01/01/91:

RATING	DATE APPLIED
1R3	09/17/99
5A2	06/20/97
4A2	06/29/96
5A2	12/21/93
--	02/13/91
5A2	01/01/91

* * * PAYMENT SUMMARY * * *

The Payment Summary section reflects payment information in D&B's file as of the date of this report.

The PAYDEX for this company is 70.

This PAYDEX score indicates that payments to suppliers average 15 days beyond terms, weighted by dollar amounts. When dollar amounts are not considered, approximately 76% of the company's payments are within terms.

Below is an overview of the company's dollar-weighted payments, segmented by its suppliers' primary industries:

	TOTAL RCV'D	TOTAL DOLLAR AMOUNTS	LARGEST HIGH CREDIT	% W/IN TERMS	DAYS SLOW <31	31-60	61-90	91+
	#	$	$	%	%	%	%	%
Total in D&B's file	438	4,966,250	700,000					
Top 10 Industries:								
1 Trucking non-local	60	294,200	100,000	68	22	-	1	9
2 Whol metal	34	1,065,900	700,000	16	75	9	-	-
3 Nonclassified	20	254,850	85,000	92	8	-	-	-
4 Arrange cargo transpt	13	90,750	35,000	10	90	-	-	-
5 Mfg industrial gases	8	1,045,250	500,000	100	-	-	-	-
6 Steel works	7	915,000	300,000	58	39	-	3	-
7 Steel investmnt fndry	3	112,500	95,000	96	4	-	-	-
8 Clay refractory	2	115,000	100,000	44	43	-	13	-
9 Mfg carbon/grpht prdt	1	200,000	200,000	100	-	-	-	-
10 Mfg abrasive products	1	80,000	80,000	100	-	-	-	-
11 OTHER INDUSTRIES	275	775,450	50,000	58	39	3	-	-
Other Payment Categories:								
Cash experiences	0	0	0					
Payment record unknown	14	17,350	5,000					
Unfavorable comments	0	0	0					
Placed for collection with D&B	0	0						
Placed for collection other	0	N/A						

The highest "Now Owes" on file is $300,000

The highest "Past Due" on file is $70,000

Dun & Bradstreet has 438 payment experiences in its file for this company. For your convenience, we have displayed 80 representative experiences in the PAYMENTS section.

==========

PAYMENTS (Amounts may be rounded to nearest figure in prescribed ranges)

Antic - Anticipated (Payments received prior to date of invoice)
Disc - Discounted (Payments received within trade discount period)
Ppt - Prompt (Payments received within terms granted)

REPORTED	PAYING RECORD	HIGH CREDIT	NOW OWES	PAST DUE	SELLING TERMS	LAST SALE WITHIN
07/00	Ppt Lease agreement					
	Ppt Lease agreement					
	Ppt	95000	55000	-0-	N45	1 Mo
	Ppt	25000	-0-	-0-		4-5 Mos
	Ppt	20000	10000	-0-		1 Mo
	Ppt	7500	5000	50	N45	1 Mo
	Ppt	5000	1000	-0-		1 Mo
	Ppt	5000	2500	500	N30	1 Mo
	Ppt	5000	1000	-0-	N45	1 Mo
	Ppt	5000	1000	-0-	N30	1 Mo
	Ppt	2500	-0-	-0-		1 Mo
	Ppt	2500	2500			6-12 Mos
	Ppt	2500	-0-	-0-	N30	6-12 Mos
	Ppt	2500	1000	-0-	N30	1 Mo
	Ppt	2500	-0-	-0-	N30	2-3 Mos
	Ppt	2500	250	-0-	N30	1 Mo
	Ppt	1000	250	-0-		1 Mo
	Ppt	1000	750	-0-	N30	1 Mo
	Ppt	1000	-0-	-0-	N30	4-5 Mos
	Ppt	1000	-0-	-0-		2-3 Mos
	Ppt	1000	-0-	-0-		4-5 Mos
	Ppt	1000	-0-	-0-		1 Mo
	Ppt	1000	-0-	-0-		4-5 Mos
	Ppt	1000	-0-	-0-	N60	1 Mo
	Ppt	1000	-0-	-0-		6-12 Mos
	Ppt	750	500	-0-		1 Mo
	Ppt	750	-0-	-0-		6-12 Mos
	Ppt	500	-0-	-0-		4-5 Mos
	Ppt	500	100	-0-		1 Mo
	Ppt	500	-0-	-0-		6-12 Mos
	Ppt	500	-0-	-0-		6-12 Mos
	Ppt	500	-0-	-0-		1 Mo
	Ppt	500	500	-0-		1 Mo
	Ppt	500	-0-			6-12 Mos
	Ppt	250	250	-0-		1 Mo
	Ppt	250	100	-0-		1 Mo
	Ppt	250	50	-0-		1 Mo
	Ppt	250	-0-	-0-		1 Mo
	Ppt	100	-0-	-0-		4-5 Mos
	Ppt	100	-0-	-0-	N30	1 Mo
	Ppt	100	-0-	-0-		2-3 Mos

	Ppt	50	-0-	-0-		2-3 Mos
	Ppt	50	-0-	-0-	N7	6-12 Mos
	Ppt	50	-0-	-0-		6-12 Mos
	Ppt	50	-0-	-0-	N30	6-12 Mos
	Ppt	50	50	-0-		1 Mo
	Ppt-Slow 15	2500	2500	1000		1 Mo
	Ppt-Slow 30	10000	5000	-0-		1 Mo
	Ppt-Slow 30	1000	250	-0-		1 Mo
	Ppt-Slow 30	1000	1000	500		1 Mo
	Ppt-Slow 30	500	-0-	-0-		6-12 Mos
	Ppt-Slow 30	500	-0-	-0-		4-5 Mos
	Ppt-Slow 30	100	-0-	-0-		4-5 Mos
	Ppt-Slow 60	7500	100	-0-		1 Mo
	Ppt-Slow 60	1000	-0-	-0-		6-12 Mos
	Ppt-Slow 60	250	-0-	-0-	N30	2-3 Mos
	Ppt-Slow 120	1000	750	500	1 10 N30	1 Mo
	Slow 15	20000	2500		1 10 N30	
	Slow 15	1000	-0-	-0-		2-3 Mos
	Slow 15	500	-0-	-0-	N30	2-3 Mos
	Slow 30	15000	-0-	-0-		4-5 Mos
	Slow 5-30	2500	2500	-0-		1 Mo
	Slow 30	750	-0-	-0-		4-5 Mos
	Slow 30-60	5000	250	-0-		1 Mo
	Slow 90	50	-0-	-0-	N30	6-12 Mos
	Slow 60-120	1000	1000	1000	N30	2-3 Mos
06/00	Ppt	100000	85000	-0-		1 Mo
	Ppt	15000	10000	2500		1 Mo
	Ppt-Slow 30	100000	100000	-0-		1 Mo
	Ppt-Slow 30	20000	20000	1000	1/2 10 N30	1 Mo
	Ppt-Slow 30	1000	500	100	N30	1 Mo
	Ppt-Slow 30	500	50	-0-	N30	1 Mo
	Ppt-Slow 60	750	-0-	-0-		6-12 Mos
	Slow 5	2500	-0-	-0-	N30	4-5 Mos
	Slow 10	100	-0-	-0-		2-3 Mos
	Slow 15	2500	2500	2500	N30	6-12 Mos
	Slow 30	1000	-0-	-0-	N30	2-3 Mos
	Slow 5-30	250	250	-0-	N15	1 Mo
	Slow 30-60	5000	500	250		1 Mo
	Slow 240	15000	10000	10000		6-12 Mos

* Payment experiences reflect how bills are met in relation to the terms granted. In some instances payment beyond terms can be the result of disputes over merchandise, skipped invoices etc.

* Each experience shown represents a separate account reported by a supplier. Updated trade experiences replace those previously reported.

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FINANCE
09/17/99

	Fiscal Consolidated Dec 31 1995	Fiscal Consolidated Dec 31 1996	Fiscal Consolidated Dec 31 1997
Curr Assets	157,998,000	149,937,000	149,298,000
Curr Liabs	60,046,000	58,692,000	52,498,000
Current Ratio	2.63	2.55	2.84
Worth	47,960,000	52,574,000	67,338,000
Long Term Liab	116,664,000	106,858,000	92,073,000

On SEP 17 1999 James Mathews, asst corp controller, declined financial statement.

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PUBLIC FILINGS

The following data is for information purposes only and is not the official record. Certified copies can only be obtained from the official source.

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* * * SUIT(S) * * *

CASE NO.: 96CV00220
PLAINTIFF: STATE OF WI
DEFENDANT: CRUCIBLE MATERIALS CORPORATION, EAST TROY, WI
WHERE FILED: WALWORTH COUNTY CIRCUIT COURT, ELKHORN, WI
STATUS: Judgment entered
DATE STATUS ATTAINED: 05/14/1996
DATE FILED: 05/13/1996
LATEST INFO COLLECTED: 10/21/1996

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* * * UCC FILING(S) * * *

COLLATERAL: Negotiable instruments - Account(s) - Chattel paper - Equipment - MISCELLANEOUS GOODS;CONSUMER GOODS;APRIL 13, 1992 BETWEEN CRUCIBLE MATERIALS COR
FILING NO: 02296004223
TYPE: Amendment
SEC. PARTY: MELLON BANK, N.A., AS AGENT, PITTSBURGH, PA
DEBTOR: CRUCIBLE MATERIALS CORPORATION
DATE FILED: 11/18/1996
LATEST INFO RECEIVED: 12/09/1996
ORIG. UCC FILED: 04/16/1992
ORIG. FILING NO: 02292000751
FILED WITH: CARROLL COUNTY SUPERIOR COURT CLERKS OFFICE, GA

FILING NO: 02297001364
TYPE: Continuation
SEC. PARTY: MELLON BANK, N.A., PITTSBURGH, PA
DEBTOR: CRUCIBLE MATERIALS CORPORATION
DATE FILED: 04/03/1997
LATEST INFO RECEIVED: 05/12/1997
ORIG. UCC FILED: 04/16/1992
ORIG. FILING NO: 02292000751
FILED WITH: CARROLL COUNTY SUPERIOR COURT CLERKS OFFICE, GA

COLLATERAL: Specified Negotiable instruments including proceeds and products - All Account(s) including proceeds and products - All Chattel paper including proceeds and products
FILING NO: M003530
TYPE: Original
SEC. PARTY: MELLON BANK N A AGENT, PITTSBURGH, PA
DEBTOR: CRUCIBLE MATERIALS CORP
DATE FILED: 12/21/1993
LATEST INFO RECEIVED: 01/05/1994
FILED WITH: SECRETARY OF STATE/UCC DIVISION, IA

COLLATERAL: Specified Negotiable instruments including proceeds and products - Specified Inventory including proceeds and products - Specified Account(s) including proceeds and products - Specified Computer equipment including proceeds and products - and OTHERS
FILING NO: 920000080002
TYPE: Original
SEC. PARTY: MELLON BANK NA AS AGENT, PITTSBURGH, PA
DEBTOR: CRUCIBLE MATERIALS CORP
DATE FILED: 04/21/1992
LATEST INFO COLLECTED: 09/28/1997
FILED WITH: SECRETARY OF STATE/UCC DIVISION, FL

FILING NO: 970000069444
TYPE: Continuation
DATE FILED: 04/03/1997
LATEST INFO RECEIVED: 09/05/1997

SEC. PARTY: MELLON BANK, N.A., AS AGENT, PITTSBURGH, PA
DEBTOR: CRUCIBLE MATERIALS CORPORATION
ORIG. UCC FILED: 04/21/1992
ORIG. FILING NO: 920000080002
FILED WITH: SECRETARY OF STATE/UCC DIVISION, FL

COLLATERAL: Specified Negotiable instruments including proceeds and products - Specified Inventory including proceeds and products - Specified Account(s) including proceeds and products - Specified Equipment including proceeds and products - and OTHERS
FILING NO: 20711296
TYPE: Original
SEC. PARTY: MELLON BANK NA, PITTSBURGH, PA
DEBTOR: CRUCIBLE MATERIALS CORP
DATE FILED: 04/16/1992
LATEST INFO RECEIVED: 09/18/1995
FILED WITH: SECRETARY OF STATE/UCC DIVISION, PA

This data is for informational purposes only and is not an official record. Certified copies may be obtained from the Pennsylvania Department of State.

FILING NO: 26530305
TYPE: Continuation
SEC. PARTY: MELLON BANK NA AGENT, PITTSBURGH PA
DEBTOR: CRUCIBLE MATERIALS CORPORATION
DATE FILED: 04/03/1997
LATEST INFO RECEIVED: 04/08/1997
ORIG. UCC FILED: 04/16/1992
ORIG. FILING NO: 20711296
FILED WITH: SECRETARY OF STATE/UCC DIVISION, PA

This data is for informational purposes only and is not an official record. Certified copies may be obtained from the Pennsylvania Department of State.

FILING NO: 27040777
TYPE: Partial release
SEC. PARTY: MELLON BANK NA AGENT, PITTSBURGH PA
DEBTOR: CRUCIBLE MATERIALS CORPORATION
DATE FILED: 08/26/1997
LATEST INFO RECEIVED: 09/03/1997
ORIG. UCC FILED: 04/16/1992
ORIG. FILING NO: 20711296
FILED WITH: SECRETARY OF STATE/UCC DIVISION, PA

This data is for informational purposes only and is not an official record. Certified copies may be obtained from the Pennsylvania Department of State.

COLLATERAL: Specified Negotiable instruments including proceeds and products - Specified Inventory including proceeds and products - Specified Account(s) including proceeds and products - Specified Equipment including proceeds and products - and OTHERS
FILING NO: 1494612
TYPE: Original
SEC. PARTY: MELLON BANK NA, PITTSBURGH, PA
DEBTOR: CRUCIBLE MATERIALS CORP
DATE FILED: 04/16/1992
LATEST INFO RECEIVED: 09/18/1995
FILED WITH: SECRETARY OF STATE/UCC DIVISION, MN

FILING NO: 1932822
TYPE: Continuation
SEC. PARTY: MELLON BANK, N.A., AS AGENT, PITTSBURGH, PA
DEBTOR: CRUCIBLE MATERIALS CORPORATION
DATE FILED: 04/14/1997
LATEST INFO RECEIVED: 05/19/1997
ORIG. UCC FILED: 04/16/1992
ORIG. FILING NO: 1494612
FILED WITH: SECRETARY OF STATE/UCC DIVISION, MN

COLLATERAL: Specified Negotiable instruments including proceeds and products -

Specified Inventory including proceeds and products - Specified Account(s) including proceeds and products - Specified Chattel paper including proceeds and products - and OTHERS

FILING NO: 0881558 DATE FILED: 04/16/1992
TYPE: Original LATEST INFO RECEIVED: 09/18/1995
SEC. PARTY: MELLON BANK AS AGENT, PITTSBURGH PA FILED WITH: SECRETARY OF STATE/UCC DIVISION, NC
DEBTOR: CRUCIBLE MATERIALS CORPORATION

FILING NO: 1445982 DATE FILED: 04/03/1997
TYPE: Continuation LATEST INFO RECEIVED: 09/15/1997
SEC. PARTY: MELLON BANK AS AGENT, PITTSBURGH PA ORIG. UCC FILED: 04/16/1992
ORIG. FILING NO: 0881558
DEBTOR: CRUCIBLE MATERIALS CORPORATION and OTHERS FILED WITH: SECRETARY OF STATE/UCC DIVISION, NC

This data is for information purposes only. Certification can only be obtained through the Department of the North Carolina Secretary of State.

COLLATERAL: Specified Negotiable instruments including proceeds and products - Specified Account(s) including proceeds and products - Specified Chattel paper including proceeds and products - Specified Equipment including proceeds and products

FILING NO: 92073853 DATE FILED: 04/16/1992
TYPE: Original LATEST INFO RECEIVED: 09/18/1995
SEC. PARTY: MELLON BANK NA AS AGENT, PITTSBURGH, PA FILED WITH: SECRETARY OF STATE/UCC DIVISION, CA
DEBTOR: CRUCIBLE MATERIALS CORP

This data is for informational purposes only, certification can only be obtained through the Sacramento Office of the California Secretary of State.

FILING NO: 92073853 DATE FILED: 04/03/1997
TYPE: Continuation LATEST INFO RECEIVED: 04/16/1997
SEC. PARTY: MELLON BK AS AGENT, PITTSBURGH, PA ORIG. UCC FILED: 04/16/1992
ORIG. FILING NO: 92073853
DEBTOR: CRUCIBLE MATERIALS CORPORATION FILED WITH: SECRETARY OF STATE/UCC DIVISION, CA

This data is for informational purposes only, certification can only be obtained through the Sacramento Office of the California Secretary of State.

COLLATERAL: Specified Negotiable instruments including proceeds and products - Specified Inventory including proceeds and products - Specified Account(s) including proceeds and products - Specified Chattel paper including proceeds and products - Specified Computer equipment including proceeds and products

FILING NO: 1272695 DATE FILED: 04/16/1992
TYPE: Original LATEST INFO RECEIVED: 09/18/1995
SEC. PARTY: MELLON BANK NA, PITTSBURGH, PA FILED WITH: SECRETARY OF STATE/UCC DIVISION, WI
DEBTOR: CRUCIBLE MATERIALS CORP

FILING NO: 1663451 DATE FILED: 04/14/1997
TYPE: Continuation LATEST INFO RECEIVED: 06/09/1997
SEC. PARTY: MELLON BANK NA AS AGENT, PITTSBURGH, PA ORIG. FILING NO: 1272695
FILED WITH: SECRETARY OF STATE/UCC DIVISION,
DEBTOR: CRUCIBLE MATERIALS CORP

WI

COLLATERAL: Specified Negotiable instruments including proceeds and products - Specified Account(s) including proceeds and products - Specified Fixtures including proceeds and products - Specified Equipment including proceeds and products - and OTHERS

FILING NO: 002973992 DATE FILED: 04/15/1992
TYPE: Original LATEST INFO RECEIVED: 09/18/1995
SEC. PARTY: MELLON BANK NA, PITTSBURGH, PA FILED WITH: SECRETARY OF STATE/UCC DIVISION, IL
DEBTOR: CRUCIBLE MATERIALS CORP

FILING NO: 003676026 DATE FILED: 04/10/1997
TYPE: Continuation LATEST INFO RECEIVED: 04/14/1997
SEC. PARTY: MELLON BANK NA AS AGENT, PITTSBURGH, PA ORIG. UCC FILED: 04/15/1992
ORIG. FILING NO: 002973992
DEBTOR: CRUCIBLE MATERIALS CORP FILED WITH: SECRETARY OF STATE/UCC DIVISION, IL

COLLATERAL: Specified Negotiable instruments and proceeds - Specified Account(s) and proceeds - Specified Chattel paper and proceeds - Specified Contract rights and proceeds

FILING NO: 92086461 DATE FILED: 04/16/1992
TYPE: Original LATEST INFO RECEIVED: 09/18/1995
SEC. PARTY: MELLON BANK, N. A., PITTSBURGH, PA FILED WITH: SECRETARY OF THE COMMONWEALTH/UCC DIVISION, MA
DEBTOR: CRUCIBLE MATERIALS CORPORATION

FILING NO: 97459414 DATE FILED: 04/07/1997
TYPE: Continuation LATEST INFO RECEIVED: 04/15/1997
SEC. PARTY: MELLON BANK, N. A., PITTSBURGH, PA ORIG. UCC FILED: 04/16/1992
ORIG. FILING NO: 92086461
DEBTOR: CRUCIBLE MATERIALS, CORPORATION FILED WITH: SECRETARY OF THE COMMONWEALTH/UCC DIVISION, MA

There are additional UCC's in D&B's file on this company available by contacting 1-800-223-1026.

The public record items contained in this report may have been paid, terminated, vacated or released prior to the date this report was printed.

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HISTORY
05/17/00

JOHN L VENSEL, CHB-CEO+ GENE P JAGGERS, V PRES FINANCE-TREAS-CFO+
HARVEY O SIMMONS III, SEC-GEN COUNSEL+ LORNA E CARPENTER, V PRES ADMINISTRATION
DIRECTOR(S): The officers identified by (+) and Robert Brooks, Gary Lee, Joseph Steger, Richard Corriero and David Yates.

The Corporate Details provided below may have been submitted by the management of the subject business and may not have been verified with

the government agency which records such data.

BUSINESS TYPE: Corporation - Profit
DATE INCORPORATED: 09/12/1983
STATE OF INCORP: Delaware

AUTH SHARES-COMMON: 15,000,000
PAR VALUE-COMMON: $10.0000

Stock ownership not available.

Business started 1983 by others. Present control succeeded Dec 20 1985.

100% of the common stock is owned by the employee stock ownership plan and the officers. No one individual owns more than 10% of the capital stock.

JOHN L VENSEL born 1935. 1957 graduated Duquesne University, Pittsburgh, PA. 1973 Harvard Graduate School of Business, Boston, MA. 1957-1964 employed by U S Steel. 1964-1967 employed by Crucible Steel. 1967-1979 employed by Roblin Industries. 1979-1985 employed by Colt Industries. 1985-present active as president.

GENE P JAGGERS born 1934. 1956 BA degree in accounting from University of Louisville, Louisville, KY. 1956-1961 employed by Price Waterhouse & Co. 1962-1967 employed by Corning Glass Works, Corning, NY. 1967-1969 employed by Jeffboat, Inc, IN. 1969-1980 employed by Colt Industries, Louisville, KY, 1980-1985 vice president of finance, Kentucky Electric Steel. 1985-present active here.

HARVEY O SIMMONS III born 1948. 1970 Georgetown University, Washington, DC. 1973 Union University's Albany Law School, Albany, NY and a graduate law degree from New York University, New York, NY in 1984. 1973-1977 served in U S Army as captain. 1977-1980 employed by Niagara Mohawk Power Corporation, Syracuse, NY. 1980-1985 assistant general counsel and assistant secretary Goulds Pumps Inc, Seneca Falls, NY. 1985-present active here.

LORNA E CARPENTER born 1953. Received BA degree in English from University of Wisconsin- Madison, received Masters in Counseling and Guidance from University of Wisconsin- Platteville and MBA from University of Wisconsin- Milwaukee. After graduation employed by Waukesha Foundry Division of Abex Corporation until joining Crucible Materials Corp in 1981. 1981-1992 held various personnel positions at the Trent Tube Division, the last of which was division vice president of administration. She was then corporate director of human resources in 1992 and in 1993 appointed to current position.

GARY LEE, not active here. He is an outside director. Currently chairman of the board and chief executive officer of Gary Lee Construction, Washington, DC.

ROBERT BROOKS, not active here. He is an outside director. Active as an officer of Westinghouse Air Brake, Pittsburgh, PA.

JOSEPH STEGER, not active here. President of the University of Cincinnati.

RICHARD CORRIERO, not active here. Retired partner of KPMG Peat Marwick, Syracuse, NY.

DAVID YATES. Active here as president of Crucible Specialty Metals Division, Syracuse, NY.

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OPERATION

05/17/00 Manufactures high alloy and corrosion resistant metals including automotive valve steel, tool steel, alloy and stainless steel and steel pipes (90%), compacted powder metal parts (5%) and distributes

steel products (5%). Other trade style used is: Crucible Research Center.

ADDITIONAL TELEPHONE NUMBER(S): Facsimile (Fax) 315 484-9014.

Terms are net 30 days. Has 20,000 account(s). Sells to industrial concerns and wholesalers. Territory : Worldwide. Nonseasonal.

EMPLOYEES: 1,900 which includes officer(s). 1,000 employed here

FACILITIES: Owns 30,000 sq. ft. in a three story brick Also operates plant with over 1,000,000 square feet at the captioned address.

LOCATION: Industrial section on well traveled street.

BRANCHES: This business has multiple branches, detailed branch/division information is available in Dun & Bradstreet's linkage or family tree products.

SUBSIDIARIES: This business has one subsidiary listed below. (1) Crusteel Ltd, Sheffield, United Kingdom. 100% owned. Started 1974. Operates as distributor of steel and steel related products and manufactures mould based products. Intercompany relations consist of merchandise transactions settled on normal terms.

08-07(3VU /001) 00000 068184184 H

BANK: Mellon Bank, Pittsburgh, PA

FULL DISPLAY COMPLETE

** End of HEADQUARTERS-BIR **